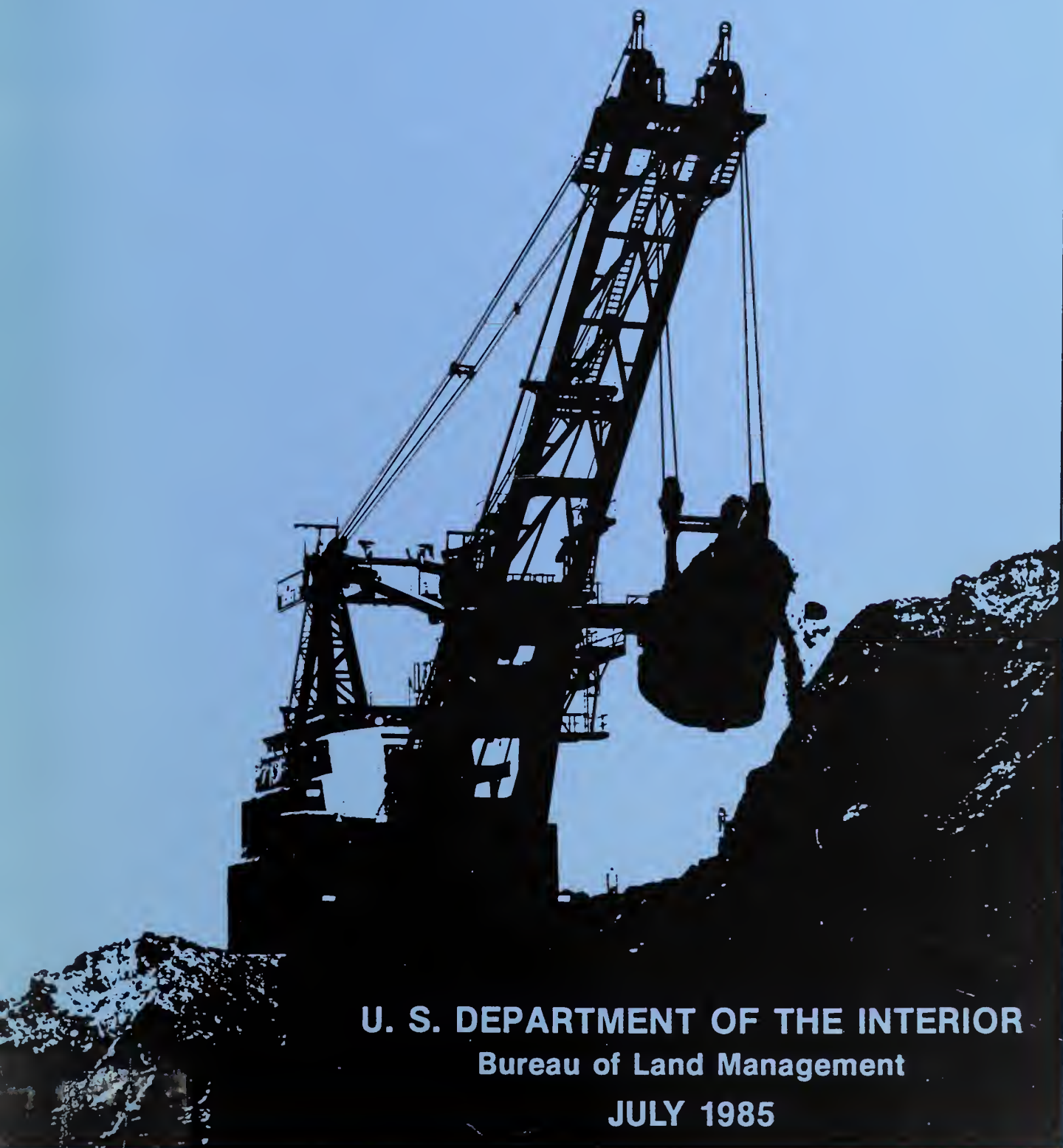


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Access To Federal Coal Property Appraisal



U. S. DEPARTMENT OF THE INTERIOR
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A GUIDE TO FEDERAL COAL PROPERTY APPRAISAL

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U.S. Department of the Interior
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CONTENTS

	Page
LIST OF FIGURES	vii
LIST OF ACRONYMS	ix
 1. INTRODUCTION	 1
1.1 Purpose	1
1.2 Fair Market Value	3
1.3 History of Coal Fair Market Value Estimation	5
1.4 Overview of the Guide	9
1.4.1 Preliminary Analysis, Data Selection, and Data Collection	9
1.4.2 Selection and Application of an Appraisal Method	9
1.4.3 Documentation of the Presale Appraisal Process	10
1.4.4 Post-Appraisal Analysis	10
 2. DATA REQUIREMENTS	 11
2.1 Introduction	11
2.2 Economic Data Requirements	12
2.2.1 General Regional Economic Data	14
2.2.2 Specific Lease Tract Economic Data	15
2.2.3 Lease-Specific Comparable Sales Data	15
2.2.4 Economic Data Report	16
2.3 Geological and Mine Engineering Data Requirements	20
2.3.1 Property Status Data	20
2.3.2 Site Minability Data	21
2.3.3 Cost Data	21
2.3.4 Geological and Engineering Data Report	22
2.4 Data Sources	25

CONTENTS (Continued)

	Page
3. METHODS AND MODELS USED FOR APPRAISAL	27
3.1 Introduction	27
3.2 Comparable Sales Approach	27
3.2.1 Overview of the Comparable Sales Approach . . .	28
3.2.2 Eligible and Selectable Comparable Sale Transactions	30
3.2.3 Comparable Sales Estimating Method	33
3.2.4 Reconciliation of Indicated Values	38
3.3 Income Approach	40
3.3.1 Overview of the Income Approach	41
3.3.2 Mine Plan Selection	43
3.3.3 Determining Revenues	43
3.3.4 Determining Mining Costs	43
3.3.5 Discount Rates	48
3.3.6 Discounted Cash Flow Analysis	50
3.3.7 Incorporating Uncertainty in the Valuation Process	50
3.3.8 Computer Models for Mineral Property Valuation	55
3.4 Application of Appraisal Methods to Federal Coal Lease Tracts	59
3.4.1 Valuation of Type 1 Tracts	61
3.4.2 Valuation of Type 2 Tracts	64
3.4.3 Valuation of Type 3 Tracts	72
3.4.4 Special Considerations	83

CONTENTS (Continued)

	Page
4. PREPARATION OF PRESALE APPRAISAL REPORT	85
4.1 Format	85
4.2 Appraisal Report Structure	85
4.2.1 Summary Page	85
4.2.2 Table of Contents	86
4.2.3 Introduction	86
4.2.4 Appraisal Tract Description	86
4.2.5 Analysis	87
4.2.6 Exhibits or Addenda	92
4.3 Signature	92
4.4 Confidentiality of Data	93
5. POST-APPRAISAL PROCESS	95
5.1 Introduction	95
5.2 Review of Presale Appraisal Report	95
5.2.1 Review of Appraisal Procedures	96
5.2.2 Review of Supporting Documentation	97
5.2.3 Documenting the Presale Appraisal Report Review	97
5.3 Post-Sale Analysis of Bids	97
5.3.1 Bid Acceptance Process	98
5.3.2 Post-Sale Appraisal Report	99
5.4 Review of Post-Sale Analysis	100
5.5 Confidentiality of Data	101
6. LAND EXCHANGE PROCESS	103
APPENDIXES	
A. Glossary	A-1
B. Bibliography	B-1

LIST OF FIGURES

	Page
2.1 Appraisal Responsibilities	13
3.1 Overview of Comparable Sales Approach	29
3.2 Overview of Income Approach	42
3.3 Cash Flow Diagram	56
3.4 Overview of Engineering Process Model for Coal Mining Costs	58

LIST OF ACRONYMS

AEOT	Average Evaluation of Tract
BLM	Bureau of Land Management
CREV	Coal Resource Economic Value
DCF	Discounted Cash Flow
DOI	Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMARS	Energy Minerals Activity Recommendation System
EPRI	Electric Power Research Institute
FCLAA	Federal Coal Leasing Amendments Act
FLPMA	Federal Land Policy Management Act
FMV	Fair Market Value
MLA	Mineral Leasing Act
MU	Mining Unit
NPV	Net Present Value
OMB	Office of Management and Budget
RET	Regional Evaluation Team
SID	Secretarial Issue Document
USGS	United States Geological Survey

Chapter 1

Introduction



1. INTRODUCTION

1.1 PURPOSE

In July 1983, Congress established the Commission on Fair Market Value Policy for Federal Coal Leasing (the Commission) to study the Federal coal management program and resolve issues concerning the Department of the Interior's leasing procedures. The Commission was directed

- o to examine statutes, policies, and procedures to ensure receipt of fair market value from Federal coal leases,
- o to evaluate efforts to improve fair market policies and procedures for the coal leasing program, and
- o to recommend improvements in the statutes, policies, and procedures.

In February 1984, the Commission transmitted its findings and recommendations to the Department of the Interior and the Congress. The Commission recommendations concerning appraisal procedures focused on factors and information that should be considered or obtained by the Government as part of the appraisal process. The Commission recognized that uncertainty is inherent in the appraisal process and recommended that the Department develop methods and procedures that are "unassailable not only in fact but also in public perception." The Commission also found that a lack of formal guidance precluded external review of appraisal procedures and suggested the development of guidelines to promote uniformity among field office appraisals and to open the procedures to public inspection.

The purpose of this guide is to present guidelines for Federal coal property¹ appraisal in terms useful to the administrator who is responsible for appraisals and to the field personnel who perform them.

¹In this guide, the term Federal coal property refers to a Federal coal property, right, or interest to be disposed of through leases, exchanges, or other methods.

An appraisal is a valuation. In the context of this guide, the principal concern is the valuation of a Federal coal property offered for lease, exchange, conveyance, lease modification, or coal right transfer. The guidelines are presented to promote a uniform approach to Federal coal property appraisal. The intent is to encourage consistent and replicable application of standard appraisal procedures.

The value estimated for Federal coal lease sales is used to ensure receipt of at least the fair market value (FMV) as required by the Federal Coal Leasing Amendments Act of 1976 (FCLAA). It is used to determine the adequacy of bids received at a lease sale. The value for other transactions is used in accordance with the authorizing legislation. As such, the appraisal process embraces a range of evaluation procedures which, when applied to available data, leads to an estimation of the property's value. In application, the data from which the appraisal is drawn often are limited, leading to an estimate that inherently is uncertain; consequently, estimates of fair market value, compensation, equal value, or other value may vary among appraisers.

The guide discusses two commonly accepted procedures for value estimation: the comparable sales approach and the income approach. The comparable sales approach is an appraisal procedure in which the prices paid in prior transactions of similar coal properties are used to value the Federal coal property to be disposed of through leasing, exchange, or other means. This procedure generally is preferred to other appraisal procedures since it is thought that prices paid in prior transactions of similar coal properties provide the best indication of value. The income approach involves the estimation of annual costs and revenues associated with the development of the coal property under realistic conditions. Annual cost and revenue streams are reduced to a single number in which future costs and revenues are discounted to the present. The property's net income potential, discounted to the present, provides an estimate of current sale value.

The two approaches to value estimation form the basis for developing from available data an estimate of the fair market value of a Federal coal property. The Regional Evaluation Team (RET) is responsible for preparing the fair market value estimate. The purpose of this guide is

to assist the RET through the appraisal process by providing a complete and systematic approach to Federal coal property valuation. If an alternative approach not discussed in the guide is selected by the RET, sufficient rationale for using the approach must be provided.

1.2 FAIR MARKET VALUE

An appraisal is concerned with an estimation of the fair market value of a property or equal value in exchange. Under the FCLAA, the Secretary of the Interior shall not accept a bid that is less than the fair market value of the coal subject to the lease. Also, specific legislation regarding coal lease and fee exchanges, as well as the Federal Land Policy Management Act of 1976 (FLPMA), requires equal value determinations. Although the term "fair market value" has no statutory definition, an accepted meaning has evolved through judicial interpretation.

The traditional definition of fair market value, as stated in Uniform Appraisal Standards for Federal Land Acquisitions,² is as follows:

"Fair market value" is defined as the amount in cash, or on terms reasonably equivalent to cash, for which in all probability the property would be sold by a knowledgeable owner willing but not obligated to sell to a knowledgeable purchaser who desired but is not obligated to buy.

²Uniform Appraisal Standards for Federal Land Acquisitions, Interagency Land Acquisition Conference, U.S. Government Printing Office, Washington, D.C., 1973.

In ascertaining that figure, consideration should be given to all matters that might be brought forward and reasonably be given substantial weight in bargaining by persons of ordinary prudence, but no consideration whatever should be given to matters not affecting market value.

The Appraisal of Real Estate³ provides a second definition of market value, as follows:

[Market value is] the most probable price in cash, terms equivalent to cash, or in other precisely revealed terms, for which the appraisal property will sell in a competitive market under all conditions requisite to fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress.

The salient features of the definitions are as follows:

1. Fair market value is characterized as, or is representative of, a transaction between a knowledgeable buyer and a knowledgeable seller.
2. Neither buyer nor seller is obligated or under duress to buy or sell.
3. Fair market value is determined by reference to a competitive market rather than to the personal or inherent value of the property.
4. The property is exposed to a competitive market for a reasonable time.

³The Appraisal of Real Estate, 8th ed., American Institute of Real Estate Appraisers, Chicago, Illinois, 1983.

In accordance with the market concept, the price paid for a similar property in an arm's-length transaction is accepted as the best evidence of fair market value. However, in the absence of a market, judicial interpretation of the fair market standard permits the valuation of the property in a hypothetical market. Factors to be considered in estimating value include probable demand, property location, and property use.

1.3 HISTORY OF COAL FAIR MARKET VALUE ESTIMATION

The need for value estimations of Federal coal properties evolved from the Mineral Leasing Act of 1920, which changed procedures for the acquisition of coal mineral rights from outright sales to leases. Early efforts to ensure reasonable value for coal property looked to the Federal Property and Administrative Services Act of 1949, whereby coal in lands reported as surplus was disposed of by the General Services Administration. In 1959, the Bureau of the Budget [now the Office of Management and Budget (OMB)] stated that fair market value should be obtained where federally owned resources are leased or sold.

Prior to 1970, the Department of the Interior paid little attention to setting a value for coal leases. Competitive and noncompetitive leases were available at little cost, because it was thought that the Federal Government would receive a fair return through royalty collection. In 1971, the Conservation Division of the U.S. Geological Survey (USGS) adopted the "K-Factor" formula of evaluation. This was an empirical formula that considered the total thickness of minable beds, the Btu value, the coking quality, and the depth. The formula included a variable, K, that was determined by the Area Mining Supervisor based on his judgment of market conditions and other factors. The K-Factor formula forced the Area Mining Supervisor to specifically consider important geological parameters. However, the formula was used for valuing few leases because in 1971 the Department issued an informal coal leasing moratorium to prevent speculation. This action was followed in 1973 by a formal moratorium on leasing, except for short-term leases meeting specific criteria, while the Department developed a new long-term leasing policy. In 1975, a programmatic environmental impact statement was released on the proposed Energy Minerals Activity

Recommendation System (EMARS) program. One of the goals of the new policy was the return of FMV for Federal coal lease tracts.

Development of new coal evaluation procedures by the Department began in late 1975 in response to criticism directed at existing evaluation procedures. The new method was based on the income approach utilizing discounted cash flow (DCF) procedures. The development efforts were carried out by the Conservation Division and included development of documented operational procedures and a computerized DCF program. Computer-generated DCF values were used as the Department's estimate of FMV.

Economic evaluation was structured as a three-level function: (1) resource determination by the area geologist, (2) mining method and mine design by the area mining supervisor, and (3) costing and economic evaluation (including tract valuation) by the economic evaluation staff. The tract results were assessed by a three-member committee that made a recommendation to the BLM State Director to be used in determining FMV.

Beginning in 1977, the Department decided to provide an indication of its estimation of value when offering leases. This took several forms between 1977 and 1980, including advertising leases at minimum bonus bids with royalty rate bidding; advertising leases at minimum statutory royalty rates and variable bonus bids; and offering the bidders a choice between the two. These published values, in effect, were the Department's presale estimate of value, and any bid at or above these amounts was accepted as FMV. During this time, concern was expressed over the meaning of FMV in light of legal requirements and Federal goals and responsibilities concerning coal leasing and development. In 1979, a Federal coal leasing FMV task force was convened to develop options for FMV and minimum acceptable bid policy and criteria. A Secretarial Issue Document (SID) was prepared, which dealt with the definition of FMV, the definition of minimum acceptable bid determination for different tract types, and other policies for Federal coal tract evaluation. The SID required that "fair market value for Federal coal leases should steer a course midway between seeking to maximize capture of economic rent and satisfying the minimum legal obligations." The SID also required that large and small tracts be

evaluated differently and that FMV should be captured through the use of higher than regulatory minimum bids where appropriate, rather than elevating the royalty rates.

To implement the SID, an Oversight Group was established to set procedures for differentiating large and small tracts. Preliminary mineral appraisal and small tract determination procedures were sent to the field personnel for implementation.

In 1980, a formal decision on small, high-rent tracts was issued. These tracts were divided into two types, and different procedures for evaluating minimum acceptable bids for each were recommended. These procedures were in effect from December 1980 to September 1982, with publication of interim procedures that strengthened the Department's ability to obtain FMV. Also in 1980, preference shifted to the use of the comparable sales approach for FMV estimation as more sales data from Federal coal leasing became available.

As part of a Department effort to streamline procedures, the Conservation Division of the USGS recommended the consideration of competition as an acceptance factor when determining FMV. In early 1982, the Department developed procedures to allow the competitive market to have an input into determining FMV.

For the Powder River region lease sale in 1982, it was decided to make the final tract value estimations after all bids had been examined. Presale estimates of values were based on adjusted comparable sales. Monetary adjustments representing the cost and revenue impacts of physical differences between the subject tracts and the comparable tracts were made using a computer program. In order not to preclude legitimate potential bidders from bidding, a decision was made not to release the presale estimates of tract values to the public. Instead, the tracts were grouped into four categories with a different entry level or floor bid for each category. Published entry level bids were based on cents per ton of recoverable coal, except for one category of \$25 per acre (the regulatory minimum). Post-sale evaluation guidelines were adopted to consider the presale values, the competition at the

sale, and discretionary special tract circumstances that were allowed to affect bid acceptance or rejection decisions.

Following the Powder River regional coal lease sale, a number of actions were taken by the Department to improve the coal lease evaluation procedures. In the summer of 1982, revised Federal coal management regulations were adopted that prescribed leasing by sealed bidding and a \$100-per-acre minimum bid.

In September 1982, the Department adopted interim lease sale procedures that called for structurally competitive tracts to be offered at a minimum bid of \$100 per acre and structurally uncompetitive tracts to be offered at a minimum bid that would constitute a representative market value, but in no event be less than \$100 per acre. Fair market value was to be determined after the sale using competition where it occurred and updated presale comparative analysis where competition did not occur. The interim procedures removed any special circumstances from the recommendation to the sale panel and relegated them to comments on the recommendation.

New procedures were adopted in July 1983 and implemented on the Fort Union coal sale, as follows: First, a dated and sealed presale evaluation was prepared. Second, no hints were given bidders as to the presale value estimates; all leases were offered at a minimum bid of \$100 per acre. Third, tight security was instituted concerning the Department's reservation prices and the number and identity of bidders until the bids were opened publicly. Fourth, a post-sale bid evaluation occurred in which acceptance of bids, if any, were based on the average of two or more substantive bids (of at least 25 percent of the presale estimate) and the presale estimate. Tracts accepted under this process became available as comparable tracts to be used, as appropriate, to estimate the value of tracts that did not receive two or more substantive bids. A complete sale panel decision document was required, and all reservation prices on tracts not sold remained confidential.

1.4 OVERVIEW OF THE GUIDE

The goal of the appraisal process is to provide a well-supported estimate of property value that reflects all factors that influence the value of the appraised property. To achieve this goal, the RET assembles data, evaluates the data, and selects the appraisal procedure that is most appropriate for the data. This process may be organized into distinct activities that lead to a formal documentation of the presale appraisal process and potential reevaluation of the appraisal based on information obtained from the lease sale. These activities include preliminary analysis, data selection, and data collection; selection and application of an appraisal method; formal documentation of the presale appraisal procedure; and post-appraisal analysis.

1.4.1 Preliminary Analysis, Data Selection, and Data Collection

An appraisal begins with the collection and evaluation of data from which the estimate of FMV will be drawn. The RET is concerned with the type, quantity, and quality of data available because these characteristics determine the valuation approach employed and provide a basis for establishing confidence in the value obtained through the appraisal process. Chapter 2 discusses general and specific data requirements, presents potential data sources, and provides information concerning the formal documentation of the data used in the appraisal process.

1.4.2 Selection and Application of an Appraisal Method

Two appraisal methods are discussed in this guide: the comparable sales approach and the income approach. The selection of an appraisal method depends upon the type of data available to the RET. When reliable comparable sales data are available, it generally is assumed that the comparable sales approach will provide the best indication of value. However, these data must meet eligibility and selectability standards; otherwise, the income approach should be used. Chapter 3 discusses each approach in detail, presents the criteria for selecting and applying each approach, and provides examples to demonstrate the application of each approach to Federal coal property valuation. The procedures for evaluating and selecting an appropriate appraisal method are

presented, as well as a delineation of the specific steps required to implement each method. Also discussed are procedures for incorporating uncertainty in the analysis and modeling and costing algorithms to assist the RET in the valuation process.

1.4.3 Documentation of the Presale Appraisal Process

The valuation process is formally documented in a written report. The report presents a summary of the data used in the valuation, the rationale for selecting a specific appraisal approach, and the method used to obtain the estimate of FMV. The organization of the presale appraisal report is presented in Chapter 4.

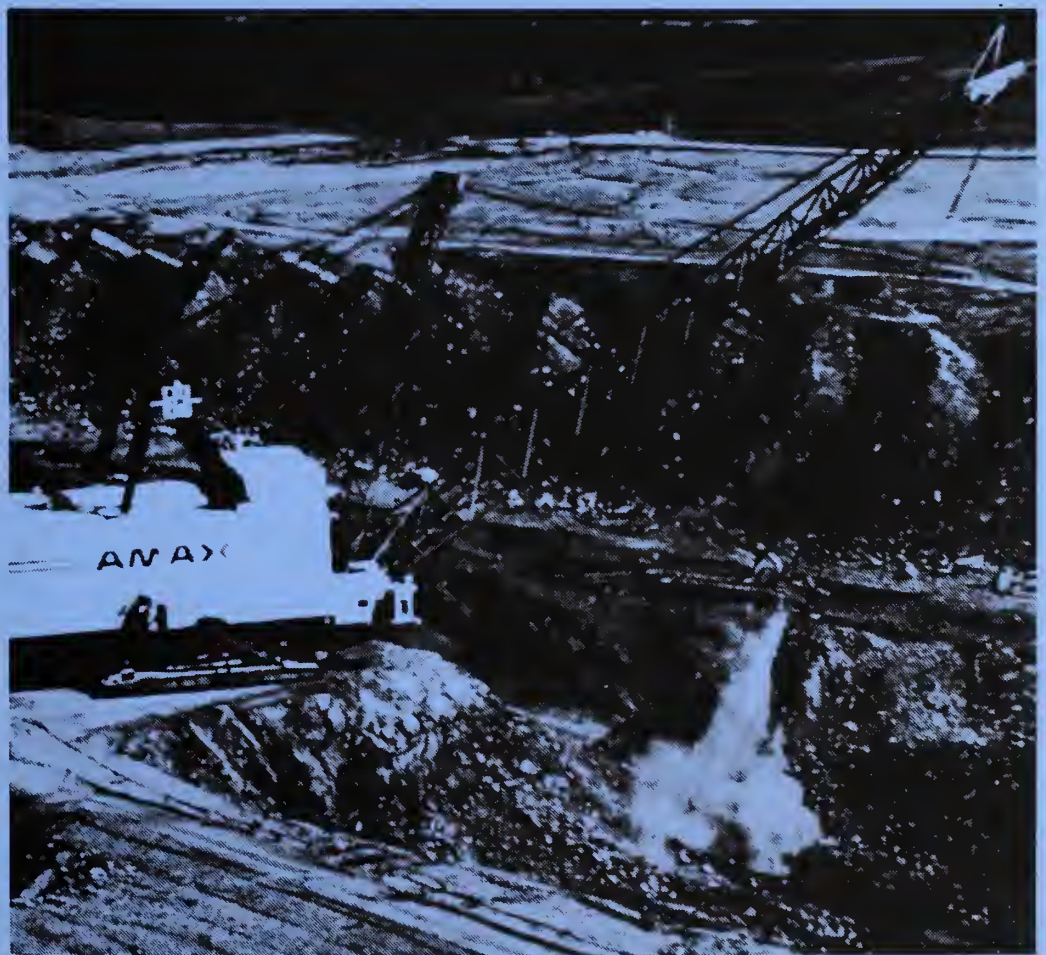
1.4.4 Post-Appraisal Analysis

The post-sale appraisal analysis includes a review of the presale appraisal process for technical accuracy and conformance to appraisal guidelines, a post-sale evaluation of bids, and a recommendation to accept or reject a bid. Chapter 5 discusses the post-appraisal process. It includes the criteria by which all bids are screened to determine if they qualify for further consideration, the bid acceptance criterion, and the use of information obtained from the lease sale to reappraise tracts that qualified for further consideration but did not meet subsequent conditions for an initial evaluation.

The valuation procedures discussed in this guide apply also to land exchanges. A land exchange involves negotiation between the government and the interested party to arrive at a fair exchange. Legislation authorizing land exchanges mandates equal value in exchange. The process for establishing equal value is presented in Chapter 6. A glossary of terms used in the guide and a bibliography are presented in the appendixes.

Chapter 2

Data Requirements



2. DATA REQUIREMENTS

2.1 INTRODUCTION

The purpose of this chapter is to present data requirements for the valuation of a Federal coal property. The appraisal process begins with a search for general and specific information that forms the data base from which the estimate of FMV is drawn. The general information provides a broad framework for the valuation process. It is used to develop or verify general regional trends in coal demand, coal markets, coal production, and coal prices. Specific information represents the actual working data that provide the value estimate. This information includes data on sales of similar coal properties, potential markets for the leased coal, site-specific geologic and engineering data, and mining cost data. The availability, type, and quality of specific information determine the appraisal method used to value the Federal coal property.

The data requirements fall into two broad categories: economic data and geologic and engineering data. Economic data are developed to evaluate short- to long-term demand for the coal type, to evaluate expected price levels and trends, and to assemble a body of data on prior transactions of similar coal properties. Geologic and engineering data are developed to evaluate coal characteristics, to construct mine plans and determine mine costs, and to compare tract characteristics with characteristics of similar coal properties.

The purpose of developing a data base is to provide a solid foundation for the estimation of value. In cooperation with the Washington office, the RET will develop information to support a regional marketing study; the RET also will develop site-specific information. The RET will receive geologic and engineering information prepared by the District and Area office geologist and mining engineer. The geologic data will be reviewed for compliance with data adequacy standards by a review council appointed by the State Director and the Regional Coal Team. The data also are to be reviewed by the RET to ensure that there is sufficient information to support the valuation of the specific Federal coal property. Because the geologic and engineering information form the basis for property valuation, questions or clarification concerning

the data are to be resolved by the appropriate Deputy State Directors. An overview of appraisal responsibilities is shown in Fig. 2.1.

The RET will organize the data it receives into an economic data report and a geologic and engineering data report to document the data, data sources, and assumptions used to develop the data. These reports will contain a statement certifying the accuracy and adequacy of the data.

The discussion that follows presents the types of data the RET will find useful to provide a proper basis for preparing an appraisal. Much of these data play an essential role in the appraisal process; other data will be supplemental. Some data will be easy to collect or develop; other data will be difficult to obtain. It is not necessary to acquire all the data elements described below to proceed with the appraisal process. It is necessary, however, that a sufficient body of data be developed to support adequately the estimation of value and to provide the rationale for the use of the data. Without sufficient data and rationale for the use of the data, the appraisal process cannot proceed. The RET may use informed judgement to infer data from limited information; however, the rationale for developing the data must be stated. Since appraisals should be made with the recognition that the estimation of value may be contested, the RET must ensure that the valuation is based on reliable data and that inputs and assumptions used in the appraisal process are sufficiently documented with the clear rationale used to derive the inputs. The RET also must ensure the confidentiality of sensitive or proprietary information.

2.2 ECONOMIC DATA REQUIREMENTS

The economic data requirements fall into the following three categories:

1. General regional economic data.
2. Specific lease tract economic data.
3. Lease-specific comparable sales data.

General regional economic data provide information from which trends in regional coal activity are drawn. Specific lease tract economic data provide information concerning coal prices, market expectations, and other information specific to the lease tract being valued. Lease-

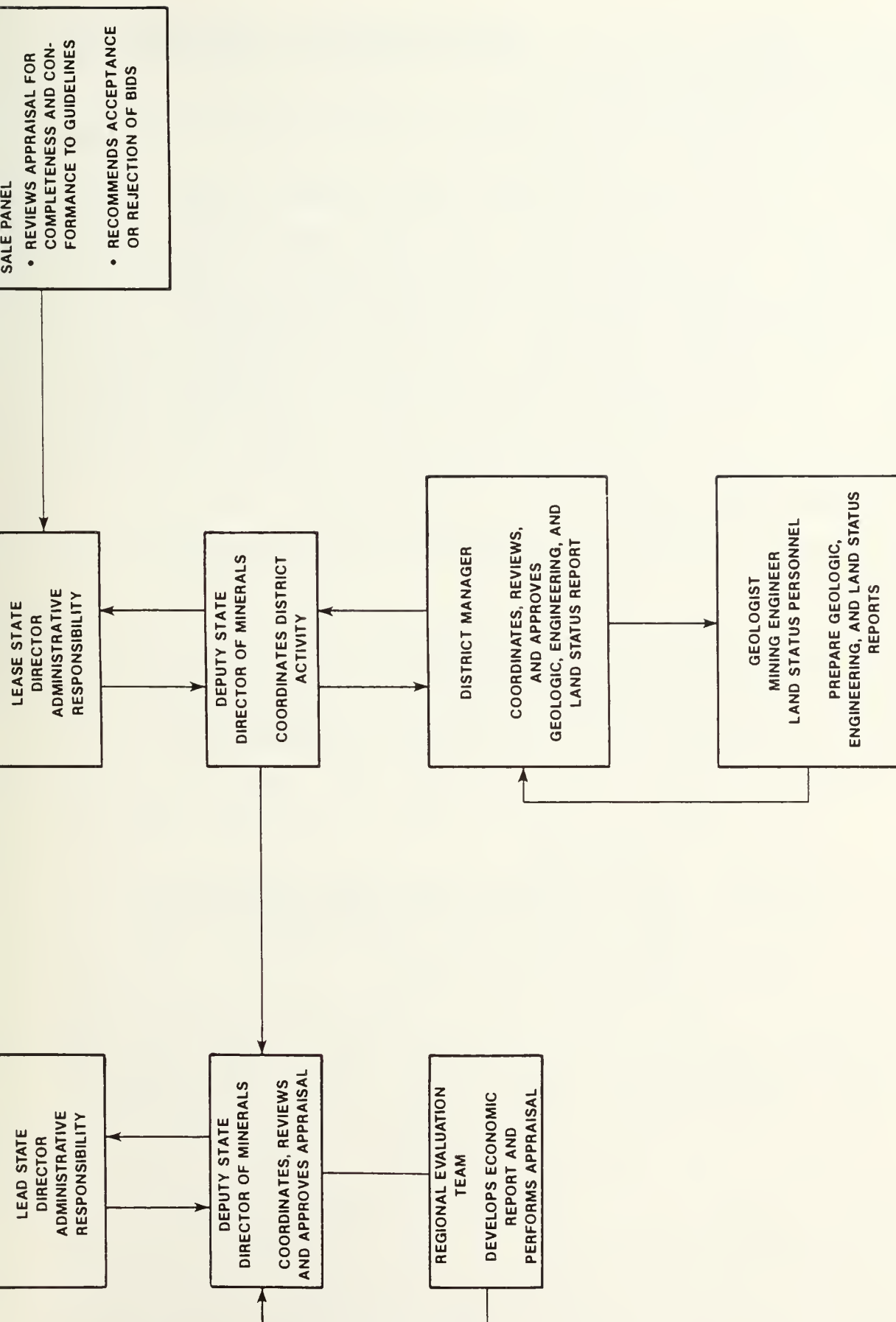


FIGURE 2.1 APPRAISAL RESPONSIBILITIES

specific comparable sales data provide information concerning prior sales of similar coal properties.

2.2.1 General Regional Economic Data

General regional economic data are based on the regional market study prepared by the Washington office (501), the RET, and support contractors. The regional market study establishes the foundation for assessing the short-, intermediate-, and long-term outlook for in situ and produced regional coal demand. It includes information concerning short- and long-term produced coal prices; short- and long-term regional mining costs; prices of coal property leases; regional supply/demand relationships; and regional mine production, including capacity and production expectation.

The information contained in the market study may be supplemented with the following data, if available:

1. Planned near- and mid-term additions to the coal-fired capacity of regional utilities.
2. Planned expansions and conversions of large industrial coal users.
3. Export potential of the coal type of the Federal coal property being appraised.
4. Regional market information concerning transportation costs and past and new coal contract prices by coal quality, mining method, and end user.

The purpose of obtaining these data is to develop quantitative and qualitative criteria for evaluating expected regional coal production activity. The market study and the supplementary data provide important information regarding the short- and long-term outlook of the regional coal market. This information establishes a basis for assessing potential interest in the lease property. Moreover, regional data on coal prices will assist in developing future price expectations of the coal type of the lease property. Coal price trends may be estimated from past data or from expected regional marginal mine cost and demand, if sufficient data are available.

2.2.2 Specific Lease Tract Economic Data

The RET will obtain economic data specific to the lease tract to be appraised. The data to be collected are as follows:

1. Potential markets for the lease tract coal.
2. Potential competition.
3. Expected market and timing of the sale of the coal and expected coal sale price.
4. Likelihood (given timing) of lease tract development and production.
5. Quality produced coal price information.
6. Marketing characteristics of an associated mine with which the lease tract may be developed, including contract prices.

Empirical sources of coal price-quality relationships for coal characteristics (e.g., Btu content, sulfur, ash) should be developed so that quality adjustments can be made to expected coal prices. Several Federal, state, and private sources provide f.o.b. mine price and c.i.f. delivered price data. New contract price data should be obtained, if available.

The RET will obtain data from neighboring mines. These data should include alternative markets, transportation access and costs, coal type and quality, contracted coal prices, mining method, and any other information that may be relevant to the valuation process. It is essential that the RET discuss likely contract prices and production costs with neighboring mine owners who may have use for the lease tract. Information from neighboring mine owners may provide realistic estimates of lease tract-specific economic data.

2.2.3 Lease-Specific Comparable Sales Data

Information concerning prior public and private coal property market transactions should be obtained, if available. Transactions should be characterized by location, coal type and quality, geologic conditions,

geographic conditions, mining conditions and costs, proximity to transportation, likely development date, probability of development, and other property characteristics that can be used to assess comparability to the lease tract. The terms of the transaction, such as royalty rate and payment terms, must be fully determined, especially if the transaction is a private sale, so that the comparable sale may be correctly used in the appraisal.

2.2.4 Economic Data Report

The economic data report represents formal documentation of the data provided by the Washington office/RET market study and any additional information obtained by the RET. The report will contain at least the minimum economic data required to support the valuation process. Raw data need not be included; however, these data should be referenced in the report to maintain an auditable link to the data. Sensitive and proprietary information can be included in the report, but the confidentiality of this information must be maintained. The report must be stamped "proprietary" if it contains confidential data. A summary of the report will be contained in the appraisal report (discussed in Chapter 4).

An outline of the economic data report is shown in Exhibit 2.1. The report contains three sections that correspond to the following distinct categories of economic data: general regional economic data, specific lease tract economic data, and lease-specific comparable sales data.

The **general regional economic overview section** will contain an overview of the regional market activity. Data and data sources used to assess the short-, intermediate-, and long-term outlook for the regional coal reserves will be documented; the market study prepared jointly by the Washington office and the RET will be summarized; and the additional information provided by other offices and collected by the RET will be presented. The section will include an assessment of regional demand and potential markets, regional lease sale price trends, regional coal price trends and coal price-quality data, and an evaluation of regional capacities.

EXHIBIT 2.1 OUTLINE OF ECONOMIC DATA REPORT

I. GENERAL REGIONAL ECONOMIC OVERVIEW SECTION

A. Regional Demand Overview

1. Short-, intermediate-, and long-term demand for in situ and produced regional coal
2. Short-, intermediate-, and long-term market information

B. Regional Supply/Demand Relationships

1. Mine production
 - a. Capacity
 - b. Production expectation
2. Planned additions to coal-fired capacity of regional utilities
3. Planned expansions and conversions of large industrial coal users
4. Export potential of regional coal

C. Trends in Regional Coal Prices

1. Short- and long-term trends in produced coal prices
2. Past and new coal contract prices
 - a. Coal quality
 - b. Mining method
 - c. End user

D. Trends in Regional Mining Cost

1. Short- and long-term trend in mining cost
2. Transportation costs

II. SPECIFIC LEASE TRACT ECONOMIC DATA

A. General Lease Tract Market Information

1. Potential markets
2. Potential competition
3. Marketing characteristics of associated mine

B. Specific Lease Tract Market Information

1. Likelihood and timing of lease tract development and production
2. Coal quality and produced coal price
 - a. Coal price-quality relationships
3. Transportation access

EXHIBIT 2.1 OUTLINE OF ECONOMIC DATA REPORT (Continued)

C. Neighboring Mine Information

1. Alternative markets
2. Coal type and quality
3. Contract or spot prices
4. Transportation access and costs
5. Mining method
6. Operating schedule
7. Capacity

III. LEASE-SPECIFIC COMPARABLE SALES DATA

A. Transaction Terms

1. Sale price and terms
2. Location
3. Royalty rate
4. Timing of development
5. Other terms

B. Geologic Data

1. Geologic conditions
2. Geographic conditions

C. Mining Data

1. Mining conditions
 - a. Overburden data
 - b. Interburden data
 - c. Coal seam data
2. Resource information
 - a. Coal type and quality (proximate analysis)
 - b. Recoverable tonnage
3. Proximity to transportation

D. Marketing Data (if available)

1. Likelihood of market
2. Timing of market
3. Mine unit and coal price
 - a. Potential
 - b. Existing

The **specific lease tract economic data section** will contain property-specific economic data used either to evaluate comparable sales data or to estimate the revenue potential of the property. Data and data sources used to develop the data base of lease-related information will be documented. The section will include a discussion of the potential markets for the lease coal and an evaluation of the timing and likelihood of the lease coal markets. Also included will be an estimate of likely lease coal sale prices and a compilation of the coal price-quality data that will provide the analytical and empirical foundation for coal price-quality adjustments. The section will contain information concerning transportation access and costs, contracted coal prices, and other data obtained from neighboring mine owners or other sources. Additionally, information on capacities, costs, and markets for competing mines should be discussed.

The **lease-specific comparable sales data section** documents the data and data sources used to develop candidate properties for comparable sales analysis. The information contained in this section includes:

1. A description of the transaction, including the parties involved, the transaction date, and the transaction terms.
2. A legal description of the property, including tract name, township, range, and meridian.
3. A property description, including transportation networks.
4. A qualitative and quantitative description of factors affecting the transaction sale price, including marketing outlook at the time of the transaction, coal type and quality, and existing or potential mine status.

For completeness, each comparable sale property's geologic and mine engineering data (discussed in Section 2.3) is included in this section.

2.3 GEOLOGIC AND MINE ENGINEERING DATA REQUIREMENTS

Geologic and mine engineering data include legal and property status characteristics; geologic, geographic, and geostructural characteristics; and capital and operating cost data associated with property development. The purpose of collecting geologic and mine engineering data is twofold: to provide the mine development, cost, and production basis for determining the revenue potential of property development; and to provide the essential technical information to compare characteristics of a property being appraised with characteristics of similar properties for which there are prior transactions. The extent to which these data are collected depends upon the availability of data and the certifying body's judgment that an adequate data base is available to conduct a meaningful appraisal; the RET's and District and Area geologist's and mining engineer's assessments of available data; and the ability to provide adequate rationale for assumptions inferred from limited data.

2.3.1 Property Status Data

A legal description of the property should be developed. The description should include boundary information and other pertinent title and record data obtained from public offices, deed depositories, or other sources of public records. Property status must be delineated prior to valuation since it affects either the estimation procedure or the applicability of prior transactions of comparable properties to the appraisal process. For the purpose of Federal coal property valuation, each property may be classified as one of the following tract types: a single tract that constitutes a mining unit (MU) for a new mine operation, a single tract that constitutes a portion of an MU for a new mine operation, or a single tract that constitutes an increment to an existing mine operation. These classifications are discussed further in Section 3.4.

2.3.2 Site Minability Data

Geologic and mine engineering data should be developed for the property being appraised and for properties for which prior sale transaction information is available. The purpose of these data is to provide the RET with sufficient information to either specify a mine plan for the property or to compare salient property characteristics between the property being appraised and prior public or private coal sale transactions. Geologic and engineering property information that should be developed, if available, are:

1. Geologic properties of the tract, including coal type, coal quality and physical properties of coal, interburden, and overburden, as well as conditions that affect the minability (e.g., special water problems or rock mechanics).
2. Geometric characteristics of the tract, including areal extent, continuity, thickness, and depth of the deposit.
3. Geographic characteristics of the tract, including location, topography, and surface conditions.

2.3.3 Cost Data

Cost data are used to evaluate the revenue potential of the property or to develop an adjustment to comparable sale transactions to account for differences in property attributes. The required cost data include capital cost elements, operating cost elements, and auxiliary cost elements that characterize the economic characteristics of mine development. The cost data to be collected are defined by the mine plan developed for the property to be appraised and, when applicable, for the comparable property. The specific cost elements required by the appraisal process are discussed in detail in Section 3.3.4 and are summarized as follows:

1. Capital cost elements, which include costs associated with preproduction activity, mine development, and production.
2. Operating cost elements, which include costs associated with labor, material, maintenance, and utilities.
3. Auxiliary cost elements, which include contingency, indirect, and fixed costs.

2.3.4 Geological and Engineering Data Report

The geological engineering data report consists of three sections corresponding to the following categories of technical data: geologic and geographic data, engineering mine plan, and mine engineering data and costs. An outline of the geologic and engineering data report is presented in Exhibit 2.2

The **geologic and geographic section** presents data for the coal property being appraised and for prior transaction properties. Geologic and geographic conditions at each property affect engineering considerations that influence mine development. In some cases, drilling and geologic survey data will be available. The source of the data must be documented, and maps and descriptions of geologic sections should be included if available. If these data are unavailable, the method for estimating geologic information must be presented and substantiated. Differences in mine and lease should be cited.

The **mine plan section** presents several possible alternative mine plans for all properties (i.e., comparable properties and property to be appraised). The mine plans must be site-specific to account for all the geotechnical and economic considerations relevant to the property since geologic, geostructural, and geographic conditions at the site, as well as economic factors, influence mine development. Generic mine plans should be avoided. Consideration should be given to mine development that may reasonably be applied to the conditions at the site.

The **mine engineering section** documents the data from which minability considerations are drawn. The purpose of this section is to present the engineering data specific to property development. The data are

EXHIBIT 2.2 OUTLINE OF GEOLOGIC AND ENGINEERING DATA REPORT

I. GEOLOGIC AND GEOGRAPHIC SECTION

- A. Legal description of the area
 - 1. Legal location
 - 2. Map showing general affected area, to include roads, ditches, canals, culverts, and topography if these preclude mining
- B. Geologic characteristics
 - 1. Overburden volume, average thickness, and physical properties
 - 2. Interburden characteristics, average thickness, and physical properties
- C. Coal quality per bed (proximate analysis)
 - 1. Btu/pound
 - 2. Percent sulfur
 - 3. Percent ash
 - 4. Percent moisture
 - 5. The laboratory that conducted the analysis and the date of the analysis
- D. Coal quantity by bed
 - 1. Average thickness
 - 2. Tonnage by 40-acre subdivision
 - a. In-place
 - b. Recoverable
- E. Additional Data
 - 1. Hydrologic data and problems
 - 2. Geologic data and problems
 - a. Isopachs - overburden, interburden, coal
 - b. Structure
 - 3. Recommendation of the District on company data that was requested for existing mines, exchanges, and PRLAs.
 - 4. Verification provided by the District that the coal requested by the company does not exceed the regulatory allowance when leasing by application (i.e., emergency or bypass).

EXHIBIT 2.2 OUTLINE OF GEOLOGIC AND ENGINEERING DATA REPORT (Continued)

E. Additional Data (Continued)

5. Information provided by the District on the mining sequence of the lease modification in reference to the mine when a lease modification is considered.
6. Special stipulations

II. MINE PLAN SECTION

A. Mine plan scenario

1. Presentation of possible mine plans by the District.
2. Company data provided for exchanges, PRLAs, lease modifications, and emergency lease applications. Evaluation and recommendations of the District also should be included.

III. MINE ENGINEERING SECTION

- A. Type of mine
- B. Equipment list
- C. Manpower requirements
- D. Financial data (to be kept proprietary)
 1. Equipment costs
 2. Manpower costs
 3. Other financial data
- E. Transportation information
 1. Type of transportation
 2. Railroad spur - loop existence at or near site
 3. Access issues and problems
- F. Facility sites and improvements

used to develop the property mine plan used in subsequent analysis. Also included in this section are the region-specific cost data used to develop capital, operating, and other cost elements for property valuation. These data include regional salary structure, equipment prices, local tax structure, and other individual cost items that comprise the cost data base for the appraisal process. Differences between mine and lease should be explained.

2.4 DATA SOURCES

Exhibit 2.3 lists potential sources of data useful to the appraisal process. An annotated listing of data sources is included in Appendix B.

EXHIBIT 2.3 POTENTIAL SOURCES OF APPRAISAL INFORMATION

DATA SOURCES	DATA TYPE
Department of the Interior	
Mineral Management Service	Royalty management data
Geological Survey	Coal resource data
Office of Surface Mining	Mine-specific information
Bureau of Mines	Mine technology data
Department of Energy	Current and historical data on reserves, production, and consumption. Economic forecasts, electric power industry data. Mine costing data.
Department of Commerce	Coal export data
Department of Labor	Regional labor statistics, equipment price indexes
Department of Transportation	Coal transportation data
Interstate Commerce Commission	Coal transportation data
State and Local Governments	Prior sales transactions, regional information
Coal Property Buyer/Sellers	Comparable sales data
National Laboratories	Forecasts and other coal-related data
Private Organizations and Services	Economic and cost data
Private Producers and Consumers	Coal prices, markets, capacities
Mine Owners	Cost, markets, capacities, mine plans, and contract prices of nearby mines

Chapter 3

*Methods and Models
Used for Appraisal*



3. METHODS AND MODELS USED FOR APPRAISAL

3.1 INTRODUCTION

An appraisal is an unbiased estimate of the value of property. The appraisal process is a systematic approach to property valuation. It consists of defining data requirements, assembling the best available data, and applying an appropriate appraisal method. The principles of property valuation are presented in the Uniform Appraisal Standards for Federal Land Acquisitions and in The Appraisal of Real Estate (1983). These principles provide guidance to formulating procedures for estimating the value of a Federal coal property. The valuation of a Federal coal property is particularly complex because traditional indicators of market activity often are unavailable. Most Federal coal properties are first-time offerings to potential buyers; consequently, market information that normally results from prior sales of property may not exist. In its absence, the valuation procedure must extract from other available data a defensible estimate of Federal coal property value.

Two appraisal methods are discussed--the comparable sales approach and the income approach. In the comparable sales approach, the value of a property is estimated from prior sales of comparable properties. The basis for estimation is that the market would impute value to the subject property in the same manner that it determines value of comparable competitive properties. In the income approach, the value assigned to the property is derived from the present worth of future net monetary benefits. When sufficient data are available, the comparable sales approach is preferred to other appraisal methods.

3.2 COMPARABLE SALES APPROACH

The comparable sales approach is a method of estimating Federal coal property value that relates the value of the property being appraised to the value of comparable properties already sold. The basis of the comparable sales approach relies on the following characteristics:

1. Prices are determined in a competitive market.

2. Prices result from the negotiation between knowledgeable buyers and sellers.
3. Neither buyer nor seller is under undue pressure to buy or sell.
4. Variations in property attributes between the property being appraised and the comparable properties can be accounted for if necessary through a monetary adjustment to each comparable property's value.

The approach may be applied when it is determined that a previous sale is comparable. Previous sales do not have to be identical in order to be comparable as long as there is a technically-based judgement of reasonable similarity, or a technically-based adjustment can be made to account for differences. For example, if a lease being appraised has coal of higher energy content (Btu) than a comparable sale, the price paid for the comparable sale would be adjusted upwards.

3.2.1 Overview of the Comparable Sales Approach

The general procedure for applying the comparable sales approach is as follows (Fig. 3.1):

1. **Data Collection.** Extensively research sources of comparable sales transactions to obtain information about transactions of similar properties. Data requirements for comparable sales are discussed in Section 2.
2. **Eligibility.** Verify the accuracy and completeness of information and evidence of a transaction between knowledgeable participants not obligated to buy or sell.
3. **Selectability.** Review the property attributes for similarity to the property being appraised to determine if the data can be used without adjustment or if an adjustment is required. If an adjustment is required, determine whether sufficient information is available to adjust for differences in property attributes.

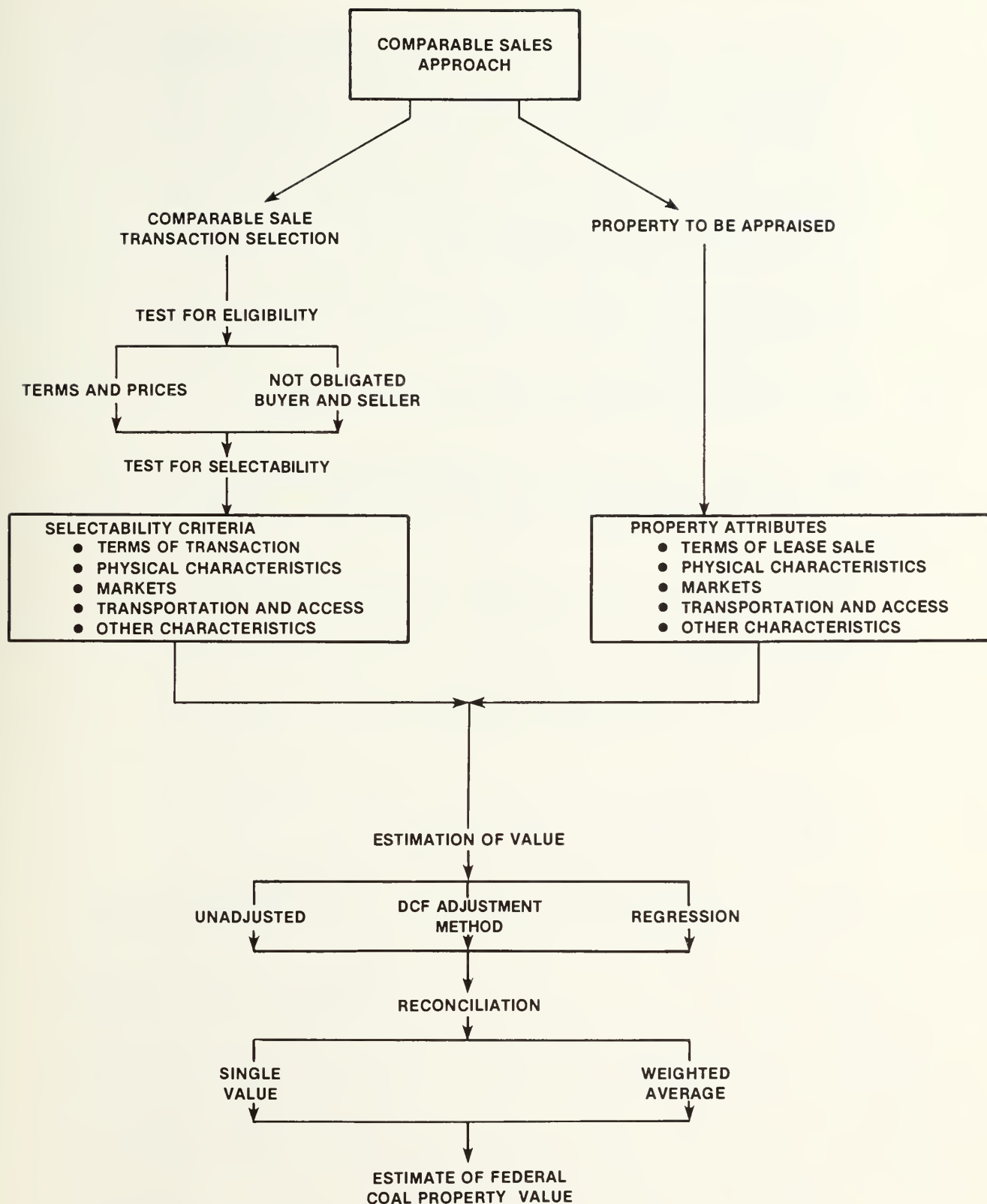


FIGURE 3.1 OVERVIEW OF COMPARABLE SALES APPROACH

4. **Estimation of Value.** Estimate value of offered property using either unadjusted or adjusted comparable sale transactions or statistical regression of comparable sale data.
5. **Reconciliation.** Reconcile multiple estimates of value into a single indication of value.
6. **Documentation.** Document the process and rationale used to estimate FMV.

3.2.2 Eligible and Selectable Comparable Sale Transactions

The Uniform Appraisal Standards for Federal Land Acquisitions provides criteria to be considered when evaluating a prior transaction as a comparable. The criteria are as follows:

1. Time interval between sale date and appraisal date.
2. Motivation of sales transaction.
3. Similarity in locational aspects.
4. Similarity in use and intensity of use.
5. Physical and economic similarities.

The first step in the comparable sales approach is to determine whether a prior transaction is truly comparable. The test for comparability is a two-tiered approach. First, the RET determines if the transaction is **eligible**. Eligible transactions then are tested for **selectability**. Candidate comparable sale transactions are screened for conformance to eligibility and selectability criteria. Transactions that meet the criteria can be used as comparables. The RET should be prepared to defend the selection of comparable sale transactions. Eligibility and selectability criteria are described below.

3.2.2.1 Eligible Transactions

The following criteria are used to determine eligible tracts:

1. **Transaction Identification.** The transaction identification should be based on an extensive search. Evidence of the search should be documented. This evidence should include details on where property records were obtained or examined and how supporting information was obtained. Potential sources of information include Federal coal lease sales, state and local offices, Indian tribes, and private sales.
2. **Transaction Terms and Price.** The terms and price of the transaction must be verified and documented.
3. **Not-Obligated Buyer and Seller.** The transaction should be examined to ensure that there is no indication of undue stimulus to buy or sell. If possible, both the buyer and the seller should be contacted to verify motivation and nature of the transaction.
4. **Knowledgeable Buyer and Seller.** Evidence should be presented demonstrating that the transaction involved a knowledgeable buyer and a knowledgeable seller and that the transaction was intended to result in the most financially favorable market price for each.

3.2.2.2 Selectable Transactions

A selectable transaction is an eligible transaction that can be used without adjustment, or it is an eligible transaction to which an adjustment to the sale price can be made to account for differences in property attributes. Property attributes to be compared are as follows:

1. **Time of Sale and Market Conditions.** Recent transactions are preferred since market conditions may have changed between the transaction date and the appraisal date.

2. **Terms of Sale.** Value is normally stated in terms of cash, or its equivalent, payable at the time of sale. The terms of sale of the property being appraised can differ from the terms of the eligible transaction. The differences should be evaluated.
3. **Physical Characteristics.** Physical characteristics (e.g., stripping ratio, seam thickness, depth to deposit, continuity) influence property value and marketability, and differences must be evaluated.
4. **Coal Characteristics.** Differences in Btu content, sulfur content, ash, and other coal quality characteristics affect coal tract value and marketability and must be evaluated.
5. **Production Scheduling.** Coal value is affected by the timing and rate of production, and differences should be evaluated.
6. **Access to Property and Transportation.** Access to the property and proximity to transportation and markets affect coal value.
7. **Type of Market.** Consideration must be given to the type of market for the coal. Differences in the market for the coals must be evaluated.
8. **Likelihood of Development.** Timing and likelihood of coal development must be evaluated since they affect the value of the coal lease.
9. **Other Factors.** Other factors that may cause value differences between the tracts should be evaluated for similarity.

3.2.2.3 Special Considerations

Certain transactions are not normally considered acceptable evidence of value. Some transactions must not be used in appraisals; others

may be used if better data are unavailable. If a "questionable" transaction is used, the RET must explain the basis for the price paid and present clear evidence as to why the transaction represents a useful indicator of value. Transactions that cannot be used as comparable sales include sales that do not show evidence of a buyer and seller not obligated to buy or sell (e.g., condemnation sales or sales where the threat of condemnation entered into negotiations). Sales between interrelated companies should not be used unless it can be shown that the sale represents an arm's-length transaction. Sales by government organizations that may have had objectives other than receipt of market value (e.g., industrial development) should not be used unless it can be ascertained that competition among bidders in these sales was itself sufficient to ensure receipt of FMV.

3.2.3 Comparable Sales Estimating Method

The comparable sales approach is preferred to other appraisal methods when comparable sales transactions are available. Comparable sale transactions can be used to estimate the value of an offered coal property by any of three alternative approaches: unadjusted transactions, DCF adjusted transactions, and regression analysis. The simplest approach is the use of one or more unadjusted comparable sale transactions to estimate coal property value. An unadjusted transaction can be used when it appears that there is sufficient commonality between comparable and offered property characteristics that the unadjusted comparable value provides a reasonable estimate of offered property value. The second approach is to adjust one or more comparable sale transactions to account for differences in property characteristics. The third approach is to develop a regression equation using comparable sales transaction data that relate offered property value to the property's characteristics. Each approach is discussed below.

3.2.3.1 Unadjusted Transactions

The comparable sales approach involves comparing characteristics of the comparable sale transaction and those of the property to be appraised. If the characteristics of the comparable sale transaction tend to match those of the offered tract, the unadjusted transaction price may be

used as an estimate of value. The use of unadjusted comparable sales transactions generally is the most popular appraisal method and often is used when circumstances permit. Its advantage is that it reduces the need to make complicated adjustments to the comparable sale transaction values, thus reducing the time required to complete an appraisal.

The RET should search for comparable properties that have similar physical characteristics to the offered property (e.g., geologic, geographic). These properties then are compared for similarity between other property/transaction characteristics, as discussed in Section 3.2.2. Individuals familiar with the regional coal activity may provide an indication of which comparable properties are similar to the offered property.

Unadjusted transaction prices can be used when the characteristics between the comparable properties and the offered property are sufficiently similar that an adjustment to the transaction price does not seem worthwhile. Single or multiple unadjusted sale prices of comparable properties whose characteristics bracket the offered property's characteristics may be used to estimate offered property value. The reconciliation of multiple unadjusted prices to a single indication of value is discussed in Section 3.2.4.

3.2.3.2 Adjusted Transactions (DCF Method)

An adjusted comparable sales transaction is used if it is necessary to account for differences between the characteristics of the comparable property and the offered property. Various methods for adjusting comparable sale transaction values to estimate offered tract value are available. In this section, the DCF adjustment method, which estimates the financial impact of differences in property characteristics, is discussed. For all intents and purposes, it is the only technically based adjustment method available at this time for Federal coal lease valuation.

Past BLM practice has been to determine individual arithmetic adjustments for each value-influencing characteristic that differs between the offered and comparable properties. The individual adjustments are summed to convert the comparable sale value to an

estimate of offered property value. This individual adjustment method is commonly applied in appraisals. An example is shown in Exhibit 3.1.

EXHIBIT 3.1

Offered tract has lower stripping ratio and Btu/lb than comparable tract.

Comparable Sale Price	3 cents per ton
+ Value stripping ratio difference	+1 cents per ton
+ <u>Value coal Btu/lb difference</u>	<u>-3 cents per ton</u>
Offered tract value estimate	1 cents per ton

The individual value differences in Exhibit 3.1 are determined by the changes in a DCF model output for a "typical" mine in the region when the stripping ratio and Btu/lb are individually altered by the respective differences between the offered tract and the comparable tract. While this approach is simple to apply, there is some concern with its accuracy because it ignores potential interrelationships between property characteristics and also assumes that both the comparable property and the tract being evaluated are well modeled by a typical regional mine. Accordingly, an alternative adjustment procedure that will mitigate these concerns is recommended when multiple significant adjustments are necessary. The alternative procedure is as follows: First, estimate a DCF net present value (NPV) for each tract, using a hypothetical most-likely mine plan. Next, apply either of two adjustment methods to estimate a value for the offered tract.

In the first adjustment method, an arithmetic adjustment to the comparable sale transaction price is performed as follows:

1. Calculate the difference between the NPVs of the offered and comparable tracts.
2. Add the difference to the comparable sales actual value.

The result is an estimate of the value per ton of the offered tract. The arithmetic adjustment method is illustrated in Exhibit 3.2.

EXHIBIT 3.2

Arithmetic Adjustment Method

1. Calculate the difference between offered tract and comparable tract NPVs.

Offered tract NPV	4.5 cents per ton
- <u>Comparable sale tract NPV</u>	- <u>6.0 cents per ton</u>
Arithmetic adjustment factor	- 1.5 cents per ton

2. Add the difference to the comparable sale price.

Comparable sale actual price	3.0 cents per ton
+ <u>Arithmetic adjustment factor</u>	- <u>1.5 cents per ton</u>
Offered tract value estimate	1.5 cents per ton

In the second approach, a proportional adjustment to the comparable sale transaction price is performed as follows:

1. Calculate the ratio between the NPV of the offered tract and the NPV of the comparable tract.
2. Multiply the comparable sale actual value by the ratio.

The result is an estimate of value per ton of the offered tract. The proportional adjustment method is illustrated in Exhibit 3.3. The proportional adjustment method currently is under study. The arithmetic adjustment method is the preferred approach until the study is completed and evaluated.

EXHIBIT 3.3

Proportional Adjustment Method

1. Calculate the ratio between offered tract and comparable tract NPVs.

Offered tract NPV	4.5 cents per ton
÷ <u>Comparable sale tract NPV</u>	÷ <u>6.0 cents per ton</u>
Proportional adjustment factor	0.75

2. Multiply the comparable sale price by the ratio.

Comparable sale actual price	3.0 cents per ton
x <u>Proportional adjustment factor</u>	x <u>0.75</u>
Offered tract value estimate	2.25 cents per ton

In each adjustment method, the adjustment is determined by modeling each tract as an income producing property. A net present value of annual cash flow is calculated from revenues and costs derived from the model. Stated briefly, the NPV is estimated using a DCF analysis as follows:

1. Develop a mine plan for the property.
2. Develop annual costs and revenues based on the mine plan and expected coal prices.
3. Select a discount rate and compute the NPV of the annual cash flow. The NPV is a measure of tract value.

The procedure for estimating NPV using the DCF method is discussed in detail in Section 3.3.

3.2.3.3 Regression Analysis

Regression analysis is an alternative comparable sales method for estimating value. Application of multiple regression procedures determines an expression of price in terms of independent characteristics that contribute significantly to property value. This application requires sufficient data to develop statistically significant results. The estimation procedure is as follows:

1. Collect data concerning property value (price) from past sales and each attribute contributing to value. Analyze the data to determine if the data base is sufficient to provide statistically significant results.
2. Apply multiple regression procedures to determine a statistical expression of property value in terms of the property attributes.
3. Estimate value by applying the attributes of the Federal coal property being appraised to the regression equation.

Regression analysis is now difficult to implement successfully for coal property evaluation because the data required for implementation are not currently available. However, as more comparable sales data become available, the necessary data base may be developed. Regression analysis is illustrated in Exhibit 3.4.

3.2.4 Reconciliation of Indicated Values

The final step in the comparable sales approach is the reconciliation of estimated (unadjusted or adjusted) values into a single indication of value of the property being appraised. In determining a single value from a set of estimated values (value indications), the RET may give more weight to specific estimated values if the values are more representative of FMV. For example, more recent transactions may be preferred to older transactions, or a particular transaction may differ in only one attribute. Regardless of the method of reconciliation used, its purpose is to provide a single estimate of property value. The RET, therefore, should provide a clear rationale for the approach to

EXHIBIT 3.4

An estimate of FMV of a Federal coal lease property is required. Recent sales of virtually identical coal properties are available in which the only significant difference between each property is the depth to the coal seam. To estimate FMV, comparable sales data are obtained that relate sale price to depth to deposit, as listed below. The depth to deposit of the Federal property is 138 feet.

Sale Price (cents per ton)	Depth to Deposit (feet)	Sale Price (cents per ton)	Depth to Deposit (feet)
7.2	150	8.2	173
7.5	140	8.6	146
7.6	132	8.7	170
7.7	151	9.0	161
7.8	139	9.0	194
7.9	154	9.4	171
8.0	164	9.7	207
8.2	152	9.9	201

Simple linear regression formula: $V = a + b D$

where

V = estimated property value

D = depth to deposit

Applying the linear regression technique:

$a = 3.43$

$b = 0.0305$

and

$V = 3.43 + 0.0305 D$ (cents per ton)

If the correlation coefficient and parameter significance tests are acceptable, proceed.

For the tract being appraised $D = 138$ ft. Thus,

$V = 3.43 + 0.0305 (138)$

$V = 7.6$ cents per ton

Fair market value is set equal to the calculated price: FMV = 7.6 cents per ton.

reconciling the indicated values. Values estimated by different methods should not be reconciled together; that is, unadjusted estimates should not be combined with adjusted estimates to produce a single indication of value. One of the following reconciliation methods may be used:

1. A single estimate of property value may be selected from alternative value indications if, in the RET's judgment, it is the only meaningful indication of property value. Basing an estimate of value on a single observation generally is undesirable unless it can be shown that the observation is highly informative and clearly superior to others.
2. Two or more value indications may be combined into a single estimate using a weighted averaging technique. When a weighted average is used, the rationale for deriving a weighting scheme must be documented.

3.3 INCOME APPROACH

The use of comparable sales is the most direct and accurate method of estimating value. Consequently, an exhaustive search for comparable sales data should be made before considering other appraisal methods. In the absence of comparable sales data, the income approach, which measures the value of a property's earning potential, is a viable alternative. The value imputed to a Federal coal property is determined by the expectation of future benefits. The income approach attempts to quantify these benefits into a single indication of value by converting future monetary benefits to present value at a specified discount rate. The process of converting future benefits to present value is called discounting.

The income approach estimates NPV of a Federal coal property by discounting projected annual cash flow to the present. The projected annual cash flow is determined from projected annual revenue, capital and operating costs, taxes, and other expenses. The data required to implement the approach are based on the economic and engineering reports discussed in Chapter 2. This information is used to project annual revenue and cost estimates for property development.

The difficulty with using the income approach to value Federal coal property is its reliance on reasonably accurate estimates of potential coal markets and mining costs. Uncertainty in potential coal markets affects the likelihood of selling the coal and the likelihood of the timing of coal production. Uncertainty in produced coal price and capital and operating costs affects the property's income stream. Consequently, the NPV of the income stream obtained by this method depends critically on the quality of the research and the effort given to developing the input parameters. Although methods are presented in this guide to account for uncertainty, it is important that all assumptions and input values be reviewed for completeness and soundness before the result of the DCF analysis is accepted as a reasonable estimate of a tract's market value. Because of the uncertainty inherent in this method, an exhaustive search for a comparable sale should be made prior to the use of the income approach.

3.3.1 Overview of the Income Approach

The general procedure for applying the income approach is as follows (Fig. 3.2):

1. **Assemble Data.** The economic and engineering reports provide the economic, market, and technical data.
2. **Develop "Best" Mine Development Plan.** Alternative or truncated mine plans contained in the engineering report are developed further to determine the "best" mine development plan for the property. The RET must be able to defend the plan as the "best" development plan for the tract.
3. **Develop Data.** Capital and operating costs, production rate, development schedule, and projected revenues are developed. The RET must be able to defend the selection of data.

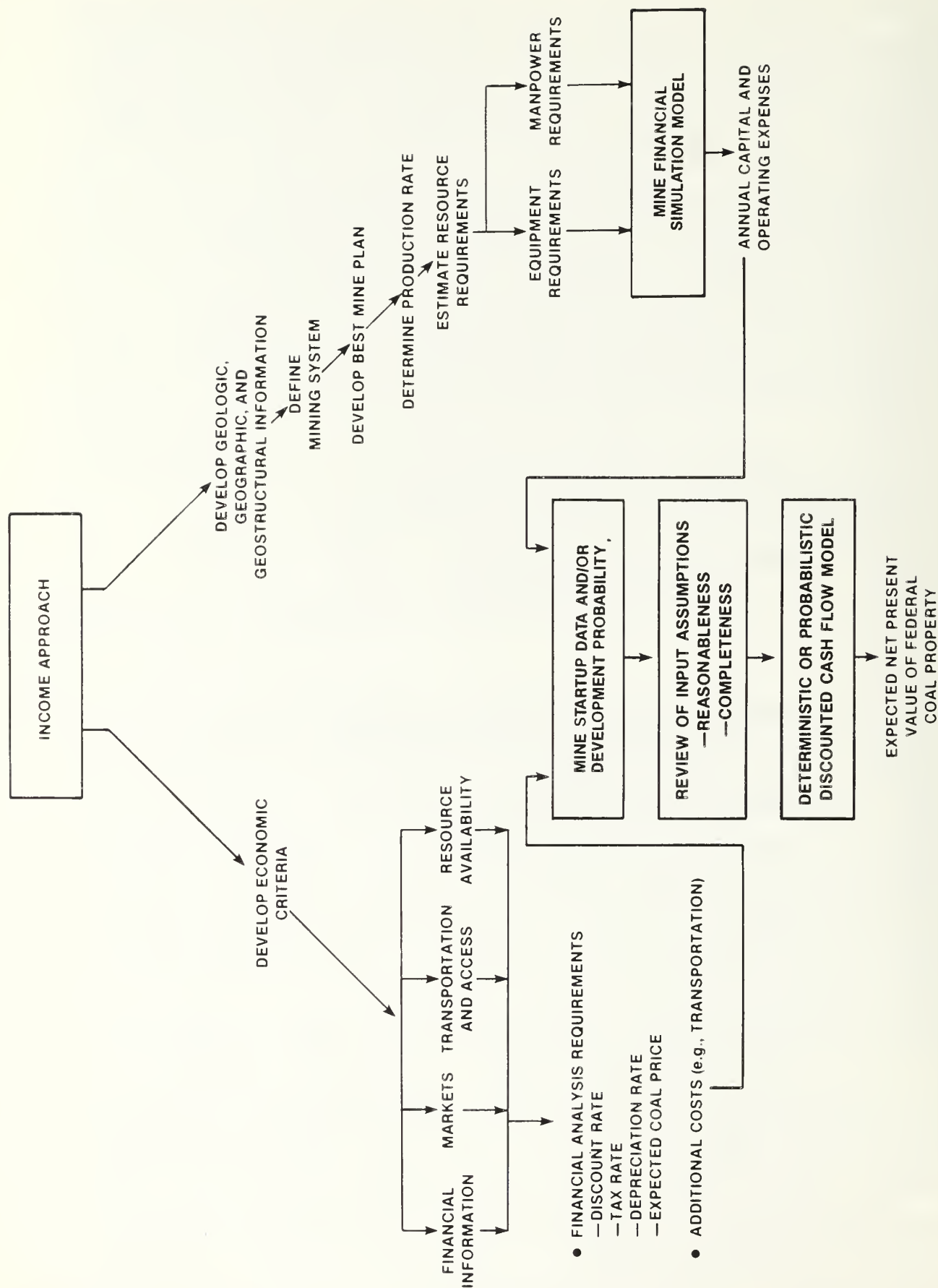


FIGURE 3.2 OVERVIEW OF INCOME APPROACH

4. **Integrate Data.** Economic and cost data are integrated to develop estimates of annual cash flow.
5. **Discounted Cash Flow Analysis.** The NPV of future benefits is determined by the DCF method.

3.3.2 Mine Plan Selection

Alternative mine plans included in the engineering report provide the basis for determining a detailed mine development plan for the property. The property mine plan should represent the "best" development method for the tract as determined by tract-specific characteristics. The RET should be prepared to defend the development plan.

A full mine plan may not be necessary for small tracts next to an existing mine. In this case, the mine plan need only show how the Federal tract will be mined so that prorated capital costs, operating costs, and contract coal prices can be applied correctly in the valuation process.

3.3.3 Determining Revenues

The production schedule developed from the mine plan should be combined with estimated or known coal price information to determine expected revenues associated with the mine operation.

3.3.4 Determining Mining Costs

The mining costs developed for the property mine plan include capital and operating expenditures associated with the mine operation. Capital costs and operating expenses are estimated from individual cost elements.

3.3.4.1 Capital Cost Elements

Capital cost elements include expenditures for services, construction, and equipment associated with preproduction activity, mine development, and production. Capital cost elements are as follows:

1. **Premining Studies.** The premining studies cost element includes expenditures associated with exploration, environmental, and engineering studies. Exploration cost includes all field activity required to define the resource sufficiently for project feasibility analysis and mine design. Environmental cost includes the cost of developing baseline environmental data and establishing mitigation protocol and monitoring activities to ensure compliance with Federal and State regulations. Engineering cost is the cost of engineering design activities, including contractor fees for engineering design and contractor management. Prelease costs also should be included because bidders probably tend to act as if they are not sunk costs but are overhead. If specific cost data are unavailable, the premining cost element may be estimated as 10 percent of total capital cost.⁴

⁴Percentage estimates of cost elements are based on information contained in Bureau of Mine studies, Department of Energy Studies, and other sources. See for example, Katell, S., and E.L. Hemingway, "Basic Estimated Capital and Operating Costs for Underground Bituminous Coal Mines," Bureau of Mines Information Circular (various years); Bertoldi, M.J., "Preliminary Economics of Mining a Thick Coal Seam by Dragline, Shovel-Truck, and Scraper Mining Systems," Bureau of Mines Information Circular, 1971; Adams, R.C., et al., "Technical and Cost Evaluation of Candidate Large Scale Open Pit Oil Shale Mining Methods in Colorado," Bureau of Mines Open File Report 156-77, 1976; Science Applications, Inc., "RAMC Underground Mining Cost Equations Development," prepared for the Energy Information Administration, 1983; Science Applications, Inc., "RAMC Surface Mining Cost Equations Development," prepared for the Energy Information Administration, 1983.

4. **Integrate Data.** Economic and cost data are integrated to develop estimates of annual cash flow.
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3.3.2 Mine Plan Selection

Alternative mine plans included in the engineering report provide the basis for determining a detailed mine development plan for the property. The property mine plan should represent the "best" development method for the tract as determined by tract-specific characteristics. The RET should be prepared to defend the development plan.

A full mine plan may not be necessary for small tracts next to an existing mine. In this case, the mine plan need only show how the Federal tract will be mined so that prorated capital costs, operating costs, and contract coal prices can be applied correctly in the valuation process.

3.3.3 Determining Revenues

The production schedule developed from the mine plan should be combined with estimated or known coal price information to determine expected revenues associated with the mine operation.

3.3.4 Determining Mining Costs

The mining costs developed for the property mine plan include capital and operating expenditures associated with the mine operation. Capital costs and operating expenses are estimated from individual cost elements.

3.3.4.1 Capital Cost Elements

Capital cost elements include expenditures for services, construction, and equipment associated with preproduction activity, mine development, and production. Capital cost elements are as follows:

1. **Premining Studies.** The premining studies cost element includes expenditures associated with exploration, environmental, and engineering studies. Exploration cost includes all field activity required to define the resource sufficiently for project feasibility analysis and mine design. Environmental cost includes the cost of developing baseline environmental data and establishing mitigation protocol and monitoring activities to ensure compliance with Federal and State regulations. Engineering cost is the cost of engineering design activities, including contractor fees for engineering design and contractor management. Prelease costs also should be included because bids are expected to assume their recovery despite their sunk nature at the time of the bid. If specific cost data are unavailable, the premining cost element may be estimated as 10 percent of total capital cost.⁴

⁴Percentage estimates of cost elements are based on information contained in Bureau of Mine studies, Department of Energy Studies, and other sources. See for example, Katell, S., and E.L. Hemingway, "Basic Estimated Capital and Operating Costs for Underground Bituminous Coal Mines," Bureau of Mines Information Circular (various years); Bertoldi, M.J., "Preliminary Economics of Mining a Thick Coal Seam by Dragline, Shovel-Truck, and Scraper Mining Systems," Bureau of Mines Information Circular, 1971; Adams, R.C., et al., "Technical and Cost Evaluation of Candidate Large Scale Open Pit Oil Shale Mining Methods in Colorado," Bureau of Mines Open File Report 156-77, 1976; Science Applications, Inc., "RAMC Underground Mining Cost Equations Development," prepared for the Energy Information Administration, 1983; Science Applications, Inc., "RAMC Surface Mining Cost Equations Development," prepared for the Energy Information Administration, 1983.

2. **Site Preparation and Surface Facilities.** Site preparation cost includes expenditures to clear and grub the area in preparation for mining and facility siting. Also included are costs to provide access to the mine site and to upgrade existing roads. Surface facilities cost includes costs associated with the construction and supply of surface facilities required to support the mining operation. This includes construction costs for general offices, engineering offices, changehouse, maintenance shops, warehouses, and load-out facilities, as well as fixtures and equipment required to support the facilities. Also included are expenditures for the purchase and installation of wells, pumps, treatment facility, piping distribution system, and other items required to supply potable water to the mine site. The surface facility cost element also includes the cost of a mine drainage system and facilities to store explosives, fuel, and water. Data for estimating these costs are provided in industry cost manuals (e.g., Means-Building Construction Cost Data), vendors, and mine cost studies.
3. **Mine Equipment.** Mine equipment cost includes purchase cost of all equipment delivered to the site and spares required to sustain production rates specified by the mine plan. Cost includes major equipment items and auxiliary items such as fire protection vehicles, small trucks, and other similar items used directly in the mining operation. Equipment costs can be based on vendor quotes.
4. **Preproduction Development.** Preproduction development cost includes the cost of all activities required to bring the mine to full production. For surface mining, these activities include, in part, the drilling, blasting, loading, hauling, and stockpiling of topsoil and overburden prior to ore production. For underground mining, the activities include the development of drifts prior to production.

5. **Indirect, Administrative, Contingency, and Working Capital.** Indirect cost accounts for miscellaneous costs not directly attributable to a specific work item. Administrative costs are the general overhead and administrative costs associated with nonproduction activity. Contingency is an allowance to provide for unpredictable costs not known at the time of the estimate. Working capital is the capital required to meet payroll expenses and other billings for material inventory, to carry accounts billings for material inventory, and to carry accounts receivable until revenue is generated. If specific costs cannot be determined, indirect and administrative costs each can be estimated as 2 percent of total capital investment.

Contingency must be included in the valuation process; it can be estimated as 10 percent of the capital cost of equipment plus 15 percent of the capital cost of facilities.⁵ Working capital usually is estimated as 90 days operating and administrative costs. Note that working capital is not an allowable tax deduction. It is treated as an initial capital cost and is returned as "salvage" at some future date.

3.3.4.2 Operating Cost Elements

Operating costs are expenditures for labor, material, maintenance, utilities, indirect, and fixed costs incurred during mining activities. Operating cost elements are as follows:

⁵Cited in memorandum from Thomas J. Blair, Chief, Economic Evaluation Unit, Bureau of Land Management, dated September 24, 1979. (See footnote 4, p. 44.)

1. **Labor.** Labor cost includes wages for hourly and salaried personnel. Salaried and hourly personnel requirements are determined from production and equipment requirements specified for the mine plan. Hourly labor manpower requirements should be based on regional operating schedules and labor practices. Additional hourly labor personnel should be added to account for vacation, sick leave, and absenteeism. Wage rates should be based on rates prevailing in the region.
2. **Equipment and Supplies.** Equipment supply cost includes expenditures for fuel, lubrication, and other supplies for mining equipment, as well as the cost of scheduled and unscheduled repairs. Equipment operating, maintenance, and supply costs may be estimated from vendor information.
3. **Utility.** Utility cost is the cost for purchased electric power. Electric power requirements can be determined from estimates of electric power requirements of equipment and surface facilities. Utility cost should be based on prevailing rate schedules obtained from the utility serving the region.
4. **Payroll Overhead.** Payroll overhead is estimated as 45 percent of direct labor cost.
5. **Contingency, Indirect, and Fixed Cost.** Contingency represents the cost of unpredictable operating expenditures; it must be included in the valuation process. Contingency is estimated as 10 percent of the equipment operating cost plus 15 percent of the facilities operating cost. Indirect cost accounts for miscellaneous operating expense not directly attributable to a specific work element. It is estimated as 15 percent of the direct labor and supply costs. Fixed cost includes expenditures for workman's compensation, the cost of insuring mine property and equipment against loss, and

the cost of insuring against personal injury and property damage liability. Fixed cost is estimated as 2 percent of the total capital investment.

Annual capital and operating costs are based on equipment requirements, manpower requirements, and development schedules derived from the engineering mine plan. These data, combined with projected coal price and other economic data, represent the input to the DCF analysis.

3.3.5 Discount Rates

The Department of the Interior currently uses a 10 percent real post tax rate of return as the discount rate for coal lease evaluation and will continue doing so pending the results of final studies in this area. The 10 percent post tax rate is derived from a 10 to 11 percent pretax real rate of return suggested by studies of the marginal rate of return on private capital, with canceling 2 or 3 percentile adjustments for taxes (-) and coal development risk (+). The use of a 10 percent post tax rate of return is checked periodically for results that consistently overestimate or underestimate tract values. The 10 percent rate is a return on total assets assuming some average debt-equity mix. To avoid double counting, debt financing should not be assumed in the DCF analysis.

The discount rates under study may be derived from the weighted cost of capital, the default free rate plus adjustments, the marginal return on capital, and the comparable sales deduction.

3.3.5.1 Weighted Cost of Capital

The weighted cost of capital is a firm-specific investment approach, although it has been employed on a broader scale. It involves the concept that the cost of capital to a firm is not constant nor sole source. Thus, allowances must be made for the cost of both debt and equity. Measuring the cost of debt is usually straightforward; however, measuring the cost of equity presents problems. Various capital-asset pricing models exist to approximate the cost of equity. The proportion of debt to equity financing is then used to get the weighted average cost of capital. Sometimes an attempt is made to get the anticipated

proportions of debt to equity so the weighted cost of capital will reflect the marginal cost rather than an average. Adjustments for taxes are generally included in the measurement of the cost of debt.

3.3.5.2 Default-Free Rates

The default-free concept is another approach to arriving at a discount rate. It can be determined by either of two methods. The first method is the default-free rate (usually governmental instruments) plus adjustments for risk. The second is the default-free rate with risk accounted for in the cash flow model scenarios (also known as the certainty-equivalent approach). A wide variety of different subsets of each of these two general methods exists.

3.3.5.3 Marginal Return on Investment

The estimated aggregate marginal return on investment averaged over a number of years can be used as a discount rate. This rate is an aggregate of all corporate returns on new investment. It is not specific to one firm or industry.⁶

3.3.5.4 Comparable Sales Deduction

If comparable property value or investment value is known, a discount rate can be determined from the discounted cash flow model. The discount rate becomes the unknown to be "solved for" in the discounted cash flow equation. Knowledge of the major components of the discounted cash flow model is essential for the computed discount rate to be credible. This technique allows for an estimation of prevailing rates used by other firms.

⁶Robert C. Lind et al., "Discounting for Energy Risk in Energy Policy," Resources for the Future, Johns Hopkins University Press, Baltimore, Maryland, 1982, p. 81.

3.3.6 Discounted Cash Flow Analysis

Federal coal property value is estimated as the NPV of the projected annual after-tax cash flow of the mine operation. Annual after-tax cash flow is determined from the annual cash income (annual revenue - annual cost) and taxes. The NPV is the sum of the annual after-tax cash flows discounted to the present at a specific discount rate. Although conceptually simple, the application of the DCF method to mineral property valuation can be complex.

A successful estimation of NPV requires that the tax consequence of capital investment be handled properly. Consequently, decisions concerning the handling of deductions to determine taxable income become important considerations to the estimation process. Allowable deductions are subtracted from gross income to determine taxable income. Deductions include royalties, operating expenses, development expenses, depreciation, and depletion. Taxes are calculated as a percentage of taxable income. To derive annual cash flow, annual gross revenues in each year are reduced by cash outlays including tax payments.

The application of the income approach using the DCF analysis to estimate value of a Federal coal property is illustrated in Exhibit 3.5.

3.3.7 Incorporating Uncertainty in the Valuation Process

It generally is acknowledged that estimates of fair market value inherently are uncertain. Despite attempts to develop the most accurate applicable data, differences in property valuation will vary among appraisers. The valuation of a Federal coal property using DCF techniques either to directly determine an estimate of value or to adjust comparable sales data depends on estimates of future events. These events cannot be estimated with certainty. For example, there is uncertainty in the market potential for the coal under lease. This uncertainty affects estimates of future coal prices and the timing of coal production. There is uncertainty in mining costs that affect the income stream from which value is estimated. And there is uncertainty in future government regulations that affect the risk associated with lease development.

EXHIBIT 3.5

Type Mining: Surface Production Rate: 5,000,000 tons per year Mine Life: 20 years	Coal Price: \$9.50 per ton Royalty: 12.5 percent Discount Rate: 10 percent
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Capital Investment Summary (in Thousand Dollars)

Premining Studies and Site Preparation	4,000
Facilities	20,000
Equipment	30,200
Preproduction Development	2,500
Indirect, Administrative, and Contingency	17,200
Replacement Capital (in tenth year)	20,000

Annual Operating Cost Summary (in Thousand Dollars)

Labor (including overhead)	9,100
Supplies, Maintenance, and Power	11,800
Indirect, Fixed, and Contingency	6,250

Annual Cash Flow Summary (in Thousand Dollars)

Year	Capital Investment	Cash Flow	Present Worth Factor	Discounted Cash Flow
0	67,400	-67,400	1.0000	-67,400
1		11,716	0.9091	10,651
2		12,939	0.8264	10,693
3		12,674	0.7513	9,522
4		12,414	0.6830	8,479
5		12,347	0.6209	7,666
6		12,016	0.5645	6,783
7		11,824	0.5132	6,069
8		11,824	0.4665	5,516
9		11,824	0.4241	5,015
10	20,000	-5,885	0.3855	-2,269
11		11,356	0.3505	3,980
12		11,156	0.3186	3,554
13		10,956	0.2897	3,174
14		10,956	0.2633	2,885
15		10,956	0.2394	2,623
16		10,184	0.2176	2,216
17		10,184	0.1978	2,014
18		10,184	0.1799	1,832
19		10,184	0.1635	1,665
20		9,287	0.1486	1,380

Net Present Value (per ton) = $1/\text{tons} \times \sum \text{Discounted Cash Flow}$

NPV = 26.0 cents per ton

Uncertainty may be incorporated in the valuation process through a number of analytical techniques. These techniques range from a sensitivity analysis that evaluates the effect on value of input parameter variation to an adjustment of the discount rate to account for risk. The guide discusses four techniques to incorporate uncertainty in the analysis. The techniques are as follows:

1. **Probability Weighted Scenarios.** A procedure by which the likelihoods of expected outcomes are combined to yield an expected value.
2. **Monte Carlo DCF Analysis.** A probabilistic form of sensitivity analysis in which the probabilistic variation in input parameters is systematically incorporated in the DCF analysis to yield an expected value.
3. **Marketing Uncertainty.** A procedure that discounts the estimated value based on subjective criteria linked to the likelihood of property development.
4. **Timing of Development.** A procedure that incorporates development timing variation in the analysis to adjust for market uncertainties.

An additional technique is to incorporate a risk premium in the discount rate to account for the higher returns required by the investor to draw investment capital to riskier ventures. The increased rate frequently serves as a proxy for the potential buyer's uncertainty of future events. In general, the use of a discount rate adjustment to account for risk is not recommended because of the overwhelming subjectivity involved in selecting the risk premium.

3.3.7.1 Probability Weighted Scenario

Despite efforts to provide an accurate measure of property value through the estimation of its NPV, uncertainty is an important and unavoidable factor in the valuation procedure since it is impossible to obtain perfect information for all the DCF inputs, some of which depend on future events. Uncertainty can be included in the valuation procedure

by using probabilistic methods. The simplest probabilistic method is to calculate the results of several alternative scenarios and to combine them by assigning a probability estimate of occurrence to each scenario. This procedure is illustrated in Exhibits 3.6

3.3.7.2 Monte Carlo DCF Analysis

An additional probabilistic method is the application of the Monte Carlo simulation technique to the DCF method. This method requires the development of probability distributions for the input variables. Often, insufficient data limits the precise development of probability distributions; however, assumed distributions (normal, triangular, uniform, etc.) and variances ($\pm 25\%$, 50% , etc.) may be used based on an evaluation of the data. Repeated application of the DCF method using Monte Carlo simulation generates an NPV distribution from which a single-weighted average (the expected NPV) can be determined. The variances selected for the Monte Carlo simulation are especially important because of the "options" effect resulting from assumed small losses and nondevelopment in negative runs. For example, higher variances may raise values of marginal properties from zero.

3.3.7.3 Marketing Uncertainty

The marketing uncertainty method reflects the uncertainty in marketing or developing coal properties by assigning an additional discount factor to adjust the estimated value for the likelihood of development during the 10-year diligence period or other applicable period. This factor is applied as a percent discount to the NPV determined by the DCF analysis, which is netted against non-development cost times its likelihood.

Because of the subjectivity inherent in selecting a discount factor, the selection must be discussed thoroughly among RET members, and the rationale for its use must be fair and reasonable (see exhibit 3.6).

3.3.7.4 Timing of Development

Uncertainty in coal marketability may be incorporated in the analysis by adjusting the time that mine development begins. For example, if a market analysis suggests that the prospects for selling leasable coal may be delayed until market uncertainty clears, the development and

EXHIBIT 3.6

A market analysis prepared for the mine in Exhibit 3.5 indicates a 50 percent probability that the coal will sell for \$9.50 per ton, a 40 percent probability that the coal will sell for \$9.00 per ton, and a 10 percent probability that the coal will sell for \$10.00 per ton.

The net present value is computed for each selling price:

1. Scenario 1: Coal price = \$9.00 per ton
(probability of occurrence = 0.4)
NPV = 13 cents per ton
2. Scenario 2: Coal price = \$9.50 per ton
(probability of occurrence = 0.5)
NPV = 26 cents per ton
3. Scenario 3: Coal price = \$10.00 per ton
(probability of occurrence = 0.1)
NPV = 37 cents per ton

The probability weighted (expected) net present value is:

$$\text{NPV} = 0.4 (13) + 0.5 (26) + 0.1 (37) = 21.9 \text{ cents per ton}$$

EXHIBIT 3.7

A market analysis prepared for the mine in Exhibit 3.5 indicates a 30 percent probability that the coal might not be sold within the 10-year diligence requirement. If a market is found, the coal will sell for \$9.50 per ton. The effective tax rate is 50 percent. Because of the lead time required for production, a decision not to develop the lease will be made at the end of the fourth year into the lease if no market develops. The bonus bid is expensed against other income at the end of the fourth year if a decision is made not to develop the lease.

The NPV of the produced coal income stream (NPV_p) is as determined in Exhibit 3.5.

$$\text{NPV}_p = \$26,048,000$$

The NPV of the income stream if coal is not produced (NPV_{np}) is

$$\text{NPV}_{np} = (0.5)B \times \text{PWF}$$

where

B = lease bonus bid

PWF = present worth factor.

The lease bonus bid is calculated as follows:

$$(1-0.3)\text{NPV}_p + 0.3 \text{NPV}_{np} - B = 0$$

$$0.7(26,048,000) + 0.3(0.5)B(0.683) - B = 0$$

The lease bonus bid is

$$B = 20.3 \text{ cents per ton.}$$

production timing should be adjusted in the model to simulate the most likely market scenarios. This adjustment has the effect of displacing costs and revenues into the future, thus reducing the present value of the income stream. Timing of development assumptions can be used either separately or in combination with the other techniques described above.

3.3.8 Computer Models for Mineral Property Valuation

3.3.8.1 DCF Computer Program

The complexity of the DCF method for mineral property valuation has led to the development of specialized computer programs. The Coal Resource Economic Value (CREV) model is an example of a computerized DCF program that has been used for Federal coal lease evaluation.

A DCF computer program simulates the accounting procedure used to determine annual cash flow of a mineral project and to develop a NPV of the cash flow stream. The financial components used to determine net cash flow are illustrated in Figure 3.3. Generally, the user provides exogenously the input data required by the program to perform the DCF analysis. However, the DCF program may be combined with mine simulation and costing algorithms to provide a complete formulation of the mine economic evaluation. Uncertainty in input values may be handled through sensitivity analysis in which key input parameters are varied selectively through their range of probable values.

3.3.8.2 Monte Carlo DCF Computer Program

The need to incorporate uncertainty in the valuation process resulted in the refinement of DCF computer codes to permit Monte Carlo simulation. Uncertainty in input values is handled by the Monte Carlo simulation program by using assumed probability distributions of input variables rather than point estimates. The simulation randomly samples each variable from its probability distribution and performs the DCF calculation. Repeated application of the simulation results in a frequency distribution of the output from which an expected value of NPV can be determined.

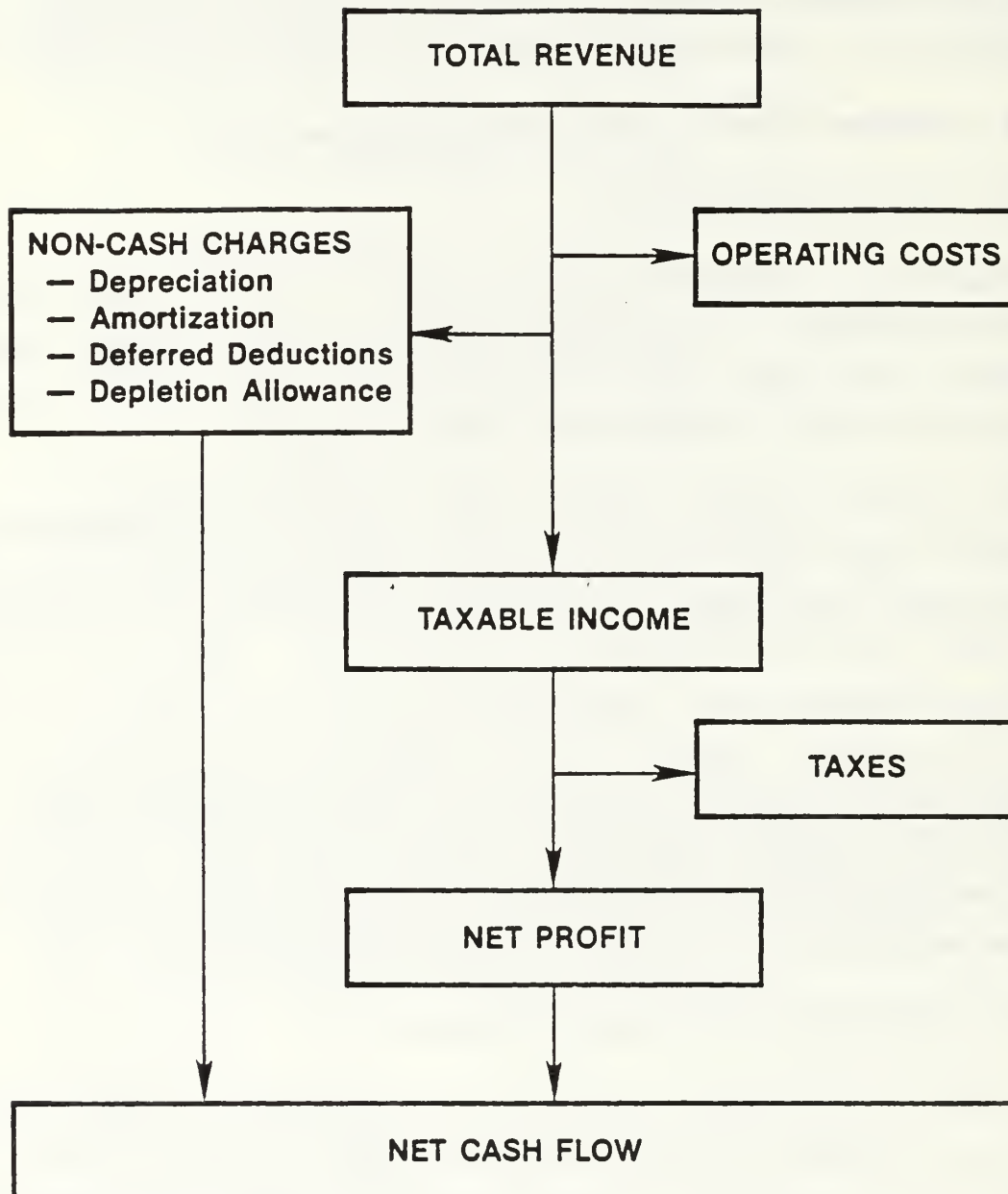


FIGURE 3.3 CASH FLOW DIAGRAM

It is recommended that the GEN4 Simulation Model for Resource Policy Evaluation be used for Federal coal property appraisal. This model, in application, is similar to the CREV model previously used for valuation; however, it has the advantage of optional Monte Carlo simulation if uncertainty in distributions is to be included in the valuation process.

In performing Monte Carlo simulations, some combinations of input values may yield negative NPVs. A negative NPV indicates either a reduced rate of return on investment (i.e., a rate of return less than the discount rate used in the simulation) or an actual loss, depending on its magnitude. In performing an appraisal, negative values will be included in the NPV distribution; however, they will be accounted for as follows: substitute the predevelopment cost whenever a negative NPV goes below this level; i.e., it is assumed that unprofitable mines are not developed or are abandoned.

3.3.8.3 Mining Simulation and Costing Algorithms

Mine simulation and costing algorithms are available to assist the RET in developing annual capital and operating cost estimates. Surface and underground coal mining cost computer models have been developed which provide procedures for estimating detailed capital and operating costs and other requirements of proposed or existing mine operations. Most mine costing models simulate the engineering processes used to produce coal through either surface mining or underground mining. The costing algorithms essentially are accounting procedures which contain several distinct steps for establishing production costs. An overview of the elements of a typical engineering process model for mine costing is illustrated in Figure 3.4.

An engineering process model consists of algorithms that model the discrete activities associated with coal production. These activities are defined by the mine plan and mine technology chosen for the property development. Using this information, an engineering process model can generate equipment requirements, manpower requirements, material requirements, and support requirements for the production activity. Capital and operating costs are developed from these requirements.

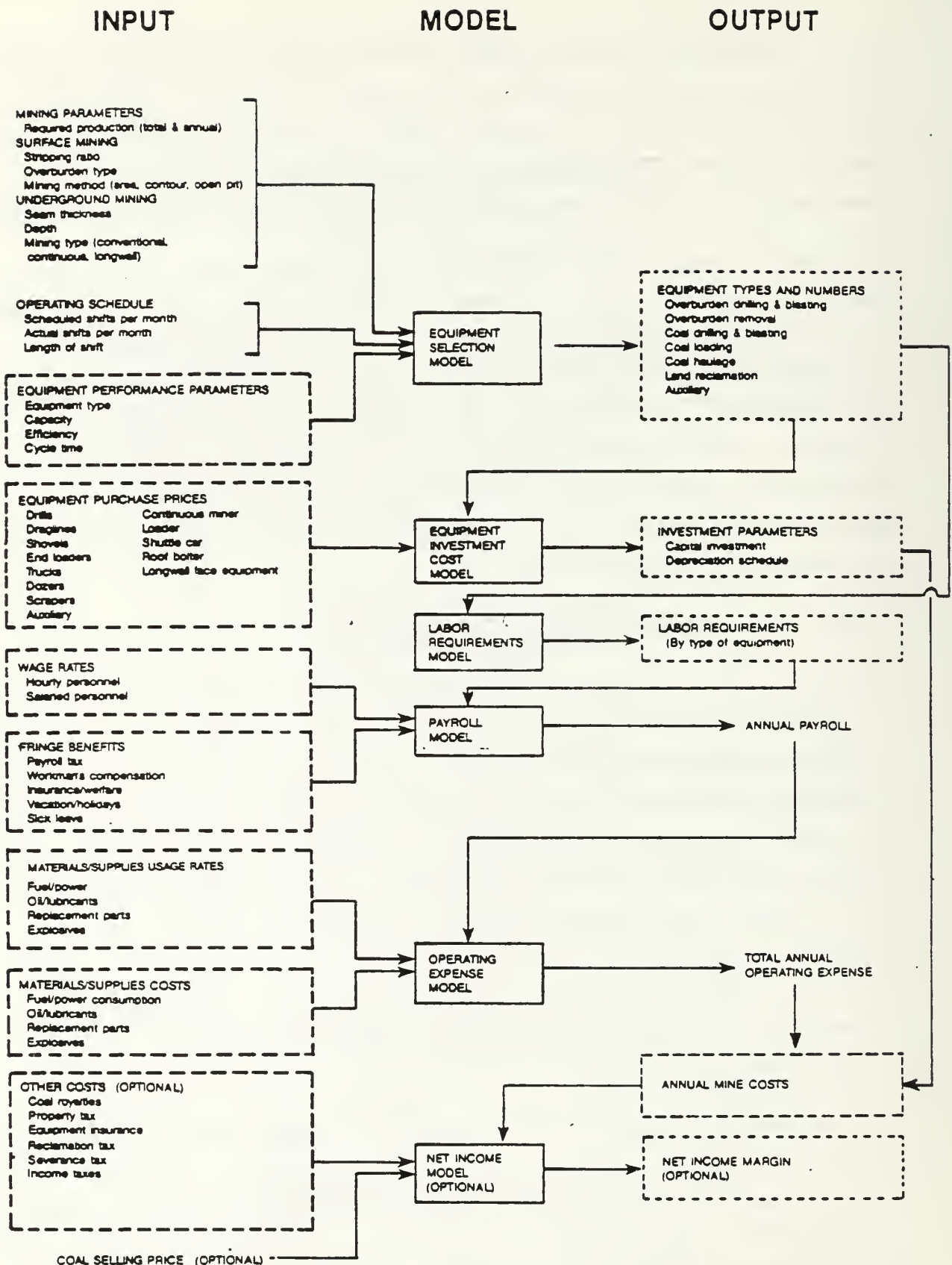


FIGURE 3.4. OVERVIEW OF ENGINEERING PROCESS MODEL FOR COAL MINING COSTS

These costs are used to generate annual cash flow from which a net present value of the income stream can be determined.

The RET is encouraged to use mine simulation and mine costing algorithms to reduce the time required to prepare an appraisal. A suitable process model should have the following characteristics:

1. Surface and underground coal mine process models must be able to model all regional mining methods to permit the RET to investigate alternative plans for coal property development.
2. All mining activities from exploration to reclamation should be represented in the model or should be available elsewhere so that the total mining cost can be estimated.
3. Mining processes should be developed in sufficient detail to reasonably simulate mining activity so that mine costs are accurately generated for a particular region and mine.
4. The process model should be sufficiently flexible to allow changes in input parameters and cost data bases.

3.4 APPLICATION OF APPRAISAL METHODS TO FEDERAL COAL LEASE TRACTS

In this section, the appraisal methods discussed above are applied to the valuation of Federal coal lease tracts. Three types of Federal coal lease tracts are described, and the use of the comparable sales approach and the income approach is discussed for each tract type. For convenience, the Federal coal lease tract types are classified as Type 1 tracts, Type 2 tracts, and Type 3 tracts. Each tract type is defined as follows:

1. **Type 1 tract.** A single tract that constitutes a mining unit for a new mine operation. The tract contains sufficient reserves that can be developed and mined in an efficient, economic, and orderly manner with due regard for the conservation of coal resources and other resources.

2. **Type 2 tract.** A single tract that constitutes a portion of an MU for a new mine operation. The tract does not contain sufficient reserves to independently support a mining operation; however, the reserves can be used with other contiguous reserves to create an MU for a new mine operation.
3. **Type 3 tract.** A single tract that constitutes an increment to an **existing** mine operation. The tract does not contain sufficient reserves to independently support a mining operation; however, the reserves can be mined economically in conjunction with an existing mine(s) operation.

Previous Federal coal property valuation procedures did not explicitly distinguish between different property types. The Commission on Fair Market Value Policy for Federal Coal Leasing in its examination of the Department's appraisal methods recognized a distinction between properties that are potentially valuable to several firms for which a reasonable degree of competition may be expected from the bid process and "captive" properties that can be developed economically only in conjunction with adjacent tracts and therefore tend to be of interest to only one firm.

The Commission recommended that a Federal coal lease tract captive to a neighboring mine be appraised according to its value to the adjoining mine or coal owner, rather than on its "competitive" or "stand-alone" value. The classification system described above permits the Federal government to distinguish between various tract types to implement the Commission's recommendation. In the discussion of the appraisal methods that follows, a captive tract is not a separate classification, but is grouped under a larger classification for appraisal purposes. Specifically, a captive tract that constitutes a portion of a new mine operation is classified as a Type 2 tract and usually is valued according to its proportional contribution to total mine value. A captive tract that constitutes a portion of an existing mine operation is classified as a Type 3 tract and is valued according to its

incremental contribution to total mine value. This valuation procedure is consistent with the recommendations of the Commission.

This section describes the application of the comparable sales approach and the income approach to the estimation of FMV of each Federal coal lease tract type. First, the comparable sales approach is discussed. Comparable sales that may be used to estimate FMV are presented for each tract type. Then the steps required to apply the comparable sales approach are delineated. Next, the income approach is discussed, and the steps for applying the income approach are delineated. Finally, other considerations required to apply the methods to the tract type are presented.

3.4.1 Valuation of Type 1 Tracts

A Type 1 Federal coal lease tract is a tract that can be an MU for a new mine operation. Comparable sales that can be used to value Type 1 tracts include:

1. Sale of an entire MU for a new mine operation.
2. Sale of a portion of an MU for a new mine operation.

3.4.1.1 Unadjusted Comparable Sales

Use the unadjusted value of a comparable sale to estimate the value of a Type 1 tract when it can be shown that the attributes of the comparable tract are sufficiently similar to the attributes of the Federal tract that an adjustment to the comparable sale price to account for differences does not provide a better estimate of value. If an unadjusted comparable sale is used, set the FMV of the Federal tract equal to the selling price (per ton) of the comparable tract:

FMV = selling price per ton of comparable tract.

Multiple unadjusted estimates of FMV are reconciled into a single estimate of value either by selecting a clearly superior value from the multiple estimates or by combining the estimates using a weighted averaging scheme, as discussed in Section 3.2.4.

3.4.1.2 Adjusted Comparable Sales

Use the DCF-adjusted value of a comparable sale to estimate the value of a Type 1 tract when it is necessary to account for differences in tract attributes. If a DCF-adjusted comparable is used, set the FMV of the Federal tract equal to the adjusted selling price (per ton) of the comparable tract. The adjusted selling price is computed as follows:

1. Estimate the NPV of the comparable tract. The NPV of the comparable tract (MU) is estimated using a DCF analysis. First, a mine plan for the comparable tract is developed. Next, capital costs and annual operating costs are estimated. The costs and revenues are combined to determine annual cash flow. The annual cash flow is discounted to the present to yield an estimate of the NPV of the comparable tract. The NPV is divided by the total tonnage of the MU to determine a value per ton.

$$\overline{\text{NPV}}_{\text{comp}} = \text{NPV}_{\text{mu}} / \text{MU tons}$$

2. Estimate the NPV of the Federal tract. The NPV of the Federal tract also is estimated using a DCF analysis, as described above. The NPV is divided by the total tonnage of the Federal tract to determine a value per ton.

$$\overline{\text{NPV}}_{\text{fed}} = \text{NPV}_{\text{fed}} / \text{tract tons}$$

3. Determine the adjustment to the comparable sale price. The comparable sale price is adjusted by either an arithmetic adjustment factor or a proportional adjustment factor. (Note: the proportional adjustment method currently is under study. Until this study is completed, the arithmetic adjustment method is preferred.) The adjustment factor is calculated as follows:

- a. Arithmetic adjustment factor:

$$D = \overline{NPV}_{fed} - \overline{NPV}_{comp}$$

- b. Proportional adjustment factor:

$$R = \overline{NPV}_{fed} / \overline{NPV}_{comp}$$

4. Estimate FMV. Set the FMV of the Federal tract equal to the adjusted comparable tract selling price.

- a. Arithmetic adjustment:

$$FMV = \text{comparable tract selling price (per ton)} + D.$$

- b. Proportional adjustment

$$FMV = \text{comparable tract selling price (per ton)} \times R.$$

5. Reconciliation of Multiple Estimates. Multiple adjusted estimates of FMV are reconciled into a single estimate of value either by selecting a clearly superior value from the multiple estimates or by combining the estimates using a weighted averaging scheme, as discussed in Section 3.2.4.

3.4.1.3 Income Approach

Use the income approach to value Type 1 tracts when comparable sales data are unavailable. The income approach is discussed in Section 3.3 and is summarized as follows:

1. Develop a mine plan. A mine plan for the Federal tract is developed. The mine plan represents the development of the property in a reasonable and realistic manner. It is based on an assumed production rate and development schedule.
2. Develop cost data. Capital costs, annual operating costs, and projected revenues are estimated.

3. Develop annual cash flow. Annual cash flow is determined from revenues, costs, and taxes.
4. Estimate FMV of the tract. The NPV of the tract is determined from the annual cash flow using a DCF analysis. The FMV of the tract is estimated by dividing the NPV by the tract tonnage.

$$\text{FMV} = \text{NPV}_{\text{fed}} / \text{tract tons.}$$

The mine plans used in the estimation procedures are based on developing the property in a realistic manner; consequently, the most-likely mining method, development schedule, and production rate form the basis of the mine plan. Estimates of capital investment and operating costs proceed logically from the mine plan. All costs are based on current equipment prices and current labor rates.

The mine plans are developed for an MU. If a comparable tract is a portion of an MU, the value of the comparable tract is assumed equal to the value (per ton) of the entire MU.

An example of the valuation of a Type 1 tract is illustrated in Exhibit 3.8.

3.4.2 Valuation of Type 2 Tracts

A Type 2 Federal coal lease tract is a tract that is a portion of an MU for a new mine operation. A Type 2 tract cannot be mined economically as an independent unit. Its value is derived from the value of the MU to which it is attached. Comparable sales that can be used to value Type 2 tracts include:

1. Sale of an entire MU for a new mine operation.
2. Sale of a portion of an MU for a new mine operation.

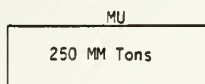
3.4.2.1 Unadjusted Comparable Sales

Use the unadjusted value of a comparable sale to estimate the value of a Type 2 tract when it can be shown that the attributes of the comparable tract are sufficiently similar to the attributes of the Federal tract that an adjustment to the comparable sale price to account

EXHIBIT 3.8

Tract Type 1: The offered Federal tract is a single tract that constitutes a mining unit.

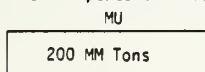
Offered Federal Tract



The offered Federal tract is a single tract that constitutes a mining unit of 250 million tons.

Comparable Tracts

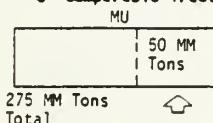
o Comparable Tract 1



The comparable tract is a prior sale of a single tract that constitutes a mining unit of 200 million tons for a new mine operation.

Selling Price = 4¢ per Ton

o Comparable Tract 2



The comparable tract is a prior sale of a 50 million ton tract that is a portion of a mining unit for a new mine operation. The combined tracts total 275 million tons.

Selling Price =
6¢ per Ton

Data Summary

Tract	Tons (in millions)		Selling Price	Calculated NPV
	in Tract	in MU		
Federal tract	250	250	---	9 cents per ton
Comparable 1	200	200	4 cents per ton	6 cents per ton
Comparable 2	50	275	6 cents per ton	10 cents per ton

The three methods for valuing a Type 1 tract are as follows:

I. Unadjusted Comparable

The FMV of the Federal tract is set equal to the unadjusted selling price of the comparable tract.

1. Using comparable sale 1: FMV = 4 cents per ton.
2. Using comparable sale 2: FMV = 6 cents per ton.
3. Reconciliation of multiple values:

In this example, the use of two comparable sales to estimate FMV of the Federal tract leads to multiple estimates of values. When two or more comparables are used, the multiple estimates of value must be reconciled into a single indication of value. The RET may select a single value estimate from the multiple estimates if the estimate is highly informative and clearly superior to the others. Otherwise, the multiple estimates are combined using a weighted averaging scheme.

II. Adjusted Comparable*

The FMV of the Federal tract is set equal to the adjusted selling price of the comparable tract.

1. Using comparable sale 1:

- a. Estimate the value of the comparable tract using a DCF analysis. The calculated value is (see Data Summary above):

$$\overline{NPV}_{comp} = 6 \text{ cents per ton.}$$

- b. Estimate the value of the Federal tract using a DCF analysis. The calculated value is:

$$\overline{NPV}_{fed} = 9 \text{ cents per ton.}$$

- c. Determine the adjustment to the comparable sale price.

1. Arithmetic adjustment factor (preferred)

$$D = \overline{NPV}_{fed} - \overline{NPV}_{comp}$$

$$D = 9 - 6$$

$$D = 3 \text{ cents per ton}$$

or

2. Proportional adjustment factor

$$R = \overline{NPV}_{fed} \div \overline{NPV}_{comp}$$

$$R = 9 \div 6$$

$$R = 1.5$$

*NOTE: If coal quality of comparable is sufficiently different than the quality of the lease tract, a price-quality adjustment must be made.

EXHIBIT 3.8 (Continued)

- d. Estimate FMV.
1. Arithmetic adjustment (preferred)
$$\text{FMV} = \text{comparable tract selling price (per ton)} + D$$
$$\text{FMV} = 4 + 3$$
$$\text{FMV} = 7 \text{ cents per ton}$$

or
 2. Proportional adjustment
$$\text{FMV} = \text{comparable tract selling price (per ton)} \times R$$
$$\text{FMV} = 4 \times 1.5$$
$$\text{FMV} = 6 \text{ cents per ton}$$
2. Using comparable sale 2:
- a. The calculated value of the comparable tract is:
$$\overline{\text{NPV}}_{\text{comp}} = 10 \text{ cents per ton.}$$
 - b. The calculated value of the Federal tract is:
$$\overline{\text{NPV}}_{\text{fed}} = 9 \text{ cents per ton.}$$
 - c. The adjustment factor is:
 1. Arithmetic adjustment factor (preferred)
$$D = \overline{\text{NPV}}_{\text{fed}} - \overline{\text{NPV}}_{\text{comp}}$$
$$D = 9 - 10$$
$$D = -1 \text{ cents per ton}$$

or
 2. Proportional adjustment factor
$$R = \overline{\text{NPV}}_{\text{fed}} \div \overline{\text{NPV}}_{\text{comp}}$$
$$R = 9 \div 10$$
$$R = 0.9$$
 - d. The estimate of FMV of the Federal tract is:
 1. Arithmetic adjustment (preferred)
$$\text{FMV} = \text{comparable tract selling price (per ton)} + D$$
$$\text{FMV} = 6 + (-1)$$
$$\text{FMV} = 5 \text{ cents per ton}$$

or
 2. Proportional adjustment
$$\text{FMV} = \text{comparable tract selling price (per ton)} \times R$$
$$\text{FMV} = 6 \times 0.9$$
$$\text{FMV} = 5.4 \text{ cents per ton}$$
3. Reconciliation of multiple values:
The multiple estimates of value must be reconciled into a single estimate of FMV.

III. Income Approach

The income approach is used to estimate value when comparable sales data are unavailable. The process is identical to the method used in the adjusted comparable sales approach to compute the net present value of the Federal tract. The FMV is set equal to the computed NPV (per ton). In this example, the NPV of the Federal tract is calculated by the DCF method as 9 cents per ton; consequently,

$$\text{FMV} = 9 \text{ cents per ton.}$$

for differences does not provide a better estimate of value. If an unadjusted comparable is used, set the FMV of the Federal tract equal to the selling price (per ton) of the comparable tract:

$$\text{FMV} = \text{selling price per ton of comparable tract.}$$

Multiple unadjusted estimates of value are to be reconciled, as discussed in Section 3.2.4.

3.4.2.2 Adjusted Comparable Sales

Use the DCF-adjusted value of a comparable sale to estimate the value of a Type 2 tract when it is necessary to account for differences in tract attributes. If a DCF-adjusted comparable is used, set the FMV of the Federal tract equal to the adjusted selling price (per ton) of the comparable tract, as discussed in Section 3.4.1.2. Multiple adjusted estimates of value are to be reconciled, as discussed in Section 3.2.4.

3.4.2.3 Income Approach

Use the income approach to value Type 2 tracts when comparable sales data are unavailable, as discussed in Section 3.4.1.3.

The mine plans used in the estimation procedures are based on developing the property in a realistic manner; consequently, the most-likely mining method, development schedule, and production rate form the basis of the mine plan. Estimates of capital investment and operating costs proceed logically from the mine plan. All costs are based on current equipment prices and current labor rates.

More than one MU may be possible for the Federal tract. Select the MU configuration that is most likely to be developed. If all MU configurations are equally likely to be developed, select the most profitable MU. The value of the Federal tract (per ton) is determined as follows:

$$\overline{\text{NPV}}_{\text{fed}} = \text{NPV}_{\text{max}} / \text{MU tons.}$$

In the comparable sale approach, the value $\overline{\text{NPV}}_{\text{fed}}$ is used to determine

the adjustment factor. In the income approach, the FMV of the tract is set equal to $\overline{\text{NPV}}_{\text{fed}}$.

An example of the valuation of a Type 2 tract is illustrated in Exhibit 3.9.

3.4.2.4 Alternative Procedures for Valuing Type 2 Tracts

Alternative procedures for estimating value of a Type 2 tract should be used if the characteristics of the Federal tract differ significantly from the characteristics of the property to which it may be combined.

1. The Federal tract is needed to make an MU in combination with existing contiguous tracts.

In this situation, the average values of the Federal tract characteristics differ significantly from the average values of the characteristics of the remaining tracts. The remaining tracts do not independently form an MU and the Federal tract is required to form an economic unit. Basing the FMV of the Federal tract on the procedures described above will yield an average tract value that will either undervalue or overvalue the Federal tract's contribution to the overall value of the MU. An alternative approach is based on the weighted average of each tract's contribution to the overall value of the MU. The procedure is as follows.

- a. Calculate the NPV of the entire MU using average mine properties exclusive of the Federal tract properties. Recall, that this procedure is used only when the Federal tract properties are significantly different from the properties of the tracts that form the remainder of the MU. For this calculation it is assumed that the entire MU has the mine properties of the remaining tracts. The calculation yields an average NPV per ton for the MU. The total value of the "remaining tracts" can be calculated from the average value and its tonnage as follows:

EXHIBIT 3.9

Tract Type 2: The offered Federal tract constitutes a portion of a mining unit for a new mine operation.

Offered Federal Tract

Federal Tract 20 MM Tons	MU 1	200 MM Tons Total
MU 2		

250 MM Tons Total

The offered Federal tract is a portion of a mining unit for a new mine operation. In this example, the offered tract containing 20 million tons may be combined either with an adjoining tract containing 180 million tons or an adjoining tract containing 230 million tons.

Comparable Tracts

o Comparable Tract 1

200 MM Tons

Selling Price = 4¢ per ton

The comparable tract is a prior sale of an entire mining unit for a new mine operation.

o Comparable Tract 2

MU	50 MM Tons Selling Price = 6¢ per Ton
----	--

275 MM Tons

The comparable tract is a prior sale of a portion of a mining unit for a new mine operation. The sale may have resulted from negotiation between the buyer and seller, or a competition among potential buyers (i.e., there may have been more than one possible MU), or a combination of the two.

Data Summary

Tract	Tons (in millions)		Selling Price	Calculated NPV
	in Tract	in MU		
Federal tract in MU 1	20	200	---	7 cents per ton
Federal tract in MU 2	20	250	---	9 cents per ton
Comparable 1	200	200	4 cents per ton	6 cents per ton
Comparable 2	50	275	6 cents per ton	10 cents per ton

The three methods for valuing a Type 2 tract are as follows:

I. Unadjusted Comparable

The FMV of the Federal tract is set equal to the unadjusted selling price of the comparable tract.

- Using comparable sale 1: FMV = 4 cents per ton.
- Using comparable sale 2: FMV = 6 cents per ton.
- Reconciliation of multiple values:

The multiple estimates of value must be reconciled into a single estimate of FMV either by selecting the clearly superior value or by combining the values using a weighted averaging scheme.

II. Adjusted Comparable

The FMV of the Federal tract is set equal to the adjusted selling price of the comparable tract.

- Using comparable sale 1:
 - Estimate the value of the comparable tract using a DCF analysis. The calculated value is (see Data Summary above):

$$\overline{\text{NPV}}_{\text{comp}} = 6 \text{ cents per ton}$$

- Estimate the value of the Federal tract using a DCF analysis. In this example, the Federal tract can be joined to either of two contiguous tracts to yield two possible MU configurations. The NPV of each configuration is computed and the NPV of the Federal tract is set equal to the larger of the calculated NPVs.

- Calculate the NPV of MU 1.

$$\overline{\text{NPV}}_{\text{mu1}} = 7 \text{ cents per ton}$$

- Calculate the NPV of MU 2.

$$\overline{\text{NPV}}_{\text{mu2}} = 9 \text{ cents per ton}$$

- Set the NPV of the Federal tract equal to the higher NPV.

$$\overline{\text{NPV}}_{\text{fed}} = 9 \text{ cents per ton}$$

EXHIBIT 3.9 (Continued)

- c. Determine the adjustment to the comparable sale price.

1. Arithmetic adjustment factor (preferred)

$$\begin{aligned}D &= \overline{NPV}_{fed} - \overline{NPV}_{comp} \\D &= 9 - 6 \\D &= 3 \text{ cents per ton}\end{aligned}$$

or

2. Proportional adjustment factor

$$\begin{aligned}R &= \overline{NPV}_{fed} \div \overline{NPV}_{comp} \\R &= 9 \div 6 \\R &= 1.5\end{aligned}$$

- d. Estimate FMV.

1. Arithmetic adjustment (preferred)

$$\begin{aligned}\text{FMV} &= \text{comparable tract selling price (per ton)} + D \\ \text{FMV} &= 4 + 3 \\ \text{FMV} &= 7 \text{ cents per ton}\end{aligned}$$

or

2. Proportional adjustment

$$\begin{aligned}\text{FMV} &= \text{comparable tract selling price (per ton)} \times R \\ \text{FMV} &= 4 \times 1.5 \\ \text{FMV} &= 6 \text{ cents per ton}\end{aligned}$$

2. Using comparable sale 2:

- a. The calculated value of the comparable tract is:

$$\overline{NPV}_{comp} = 10 \text{ cents per ton}$$

Note that this calculation is the NPV (per ton) for the entire MU. The value of the comparable is assumed equal to the value (per ton) of the entire MU.

- b. The calculated value of the Federal tract is set equal to the larger NPV calculated for each MU configuration:

$$\overline{NPV}_{fed} = 9 \text{ cents per ton}$$

- c. The adjustment factor is:

1. Arithmetic adjustment factor (preferred)

$$\begin{aligned}D &= \overline{NPV}_{fed} - \overline{NPV}_{comp} \\D &= 9 - 10 \\D &= -1 \text{ cents per ton}\end{aligned}$$

or

2. Proportional adjustment factor

$$\begin{aligned}R &= \overline{NPV}_{fed} \div \overline{NPV}_{comp} \\R &= 9 \div 10 \\R &= 0.9\end{aligned}$$

- d. The estimate of FMV of the Federal tract is:

1. Arithmetic adjustment (preferred)

$$\begin{aligned}\text{FMV} &= \text{comparable tract selling price (per ton)} + D \\ \text{FMV} &= 6 + (-1) \\ \text{FMV} &= 5 \text{ cents per ton}\end{aligned}$$

or

2. Proportional adjustment

$$\begin{aligned}\text{FMV} &= \text{comparable tract selling price (per ton)} \times R \\ \text{FMV} &= 6 \times 0.9 \\ \text{FMV} &= 5.4 \text{ cents per ton}\end{aligned}$$

3. Reconciliation of multiple values:

The multiple estimates of value must be reconciled into a single estimate of FMV.

III. Income Approach

The income approach is used to estimate value when comparable sales data are unavailable. The procedure is identical to the method described above to calculate the NPV of the Federal tract. Recall that, in this example, two NPV estimates are calculated, each corresponding to the Federal tract in a different MU configuration. The FMV of the Federal tract is set equal to the larger NPV.

$$\text{FMV} = \overline{NPV}_{fed} = 9 \text{ cents per ton}$$

$$NPV_{rt} = \overline{NPV}_{rt} \times T_{rt}$$

- b. Calculate the NPV of the entire MU using all mine properties, including the mine properties of the Federal tract. This calculation yields an average NPV per ton of an MU that includes the effect of the Federal tract on the value of the MU. The total value of the MU is calculated from the average value and the MU tonnage as follows:

$$NPV_{mu} = \overline{NPV}_{mu} \times T_{mu}$$

- c. Calculate the NPV of the entire MU using the Federal tract properties. The calculation yields an average NPV per ton for the MU. The total value of the Federal tract is calculated from the average value and its tonnage as follows:

$$NPV_{ft} = \overline{NPV}_{ft} \times T_{ft}$$

where \overline{NPV}_{mu} = NPV per ton of entire mining unit including the effect of the Federal tract

\overline{NPV}_{rt} = NPV per ton of entire mining unit excluding the effect of the Federal tract

\overline{NPV}_{ft} = NPV per ton of entire mining unit excluding the effect of the "remaining tracts."

T_{mu} = total MU tonnage

T_{rt} = total "remaining tracts" tonnage

T_{ft} = total Federal tract tonnage

Note: $T_{mu} = T_{rt} + T_{ft}$

Since the real value of the MU is some function of the combined values of the Federal tract and the "remaining tracts," equality of value results in the following equation:

$$T_{mu} \times \overline{NPV}_{mu} = \lambda (T_{ft} \times \overline{NPV}_{ft} + T_{rt} \times \overline{NPV}_{rt})$$

Solving for λ yields:

$$\lambda = \frac{T_{mu} \times \overline{NPV}_{mu}}{T_{ft} \times \overline{NPV}_{ft} + T_{rt} \times \overline{NPV}_{rt}}$$

The reconciled value of the Federal tract is computed as follows:

$$NPV_{fed} = \lambda (T_{ft} \times \overline{NPV}_{ft})$$

At this point the three cases represented by the values above need to be thoughtfully reviewed for realism. The reconciliation that is used is only needed if it can provide greater realism to the case. Thus, it is made in Exhibit 3.10 to more accurately reflect higher mining costs with heterogeneous stripping ratios. Conversely, such a reconciliation may not be needed for coal quality differences if both coals are marketable. In that situation, the extrapolation of Federal tract coal quality case is probably as realistic as the actual mine unit quality case for the Federal tract value/ton. Thus the guidance usually is to select $(T_{ft} \times \overline{NPV}_{ft})$ or $\lambda (T_{ft} \times \overline{NPV}_{ft})$ as the most realistic value and use it for comparable sales adjusted value calculations or fair market value.

2. Alternatively, if the tract is obviously an incremental additional to an existing potential mine, the guidelines presented in section 3.4.3 for Type 3 tracts can be used.

3.4.3 Valuation of Type 3 Tracts

A Type 3 Federal coal lease tract is a tract that is an increment to an existing mine operation. A Type 3 tract cannot be mined economically as an independent unit. Its value is based on its incremental value to the existing mine operation and not on its "stand-alone" value to the Federal government. Comparable sales that can be used to value Type 3 tracts include:

EXHIBIT 3.10

Tract Type 2: The offered Federal tract is combined with existing tracts to make an MU. The characteristics of the Federal tract differ significantly from the characteristics of the remaining tracts.

$$T_{rt} = 125 \text{ MM Tons} \left\{ \begin{array}{|c|c|} \hline \text{Tract 1} & \text{Federal Tract} \\ \hline \text{Tract 2} & \\ \hline \end{array} \right\} T_{mu} = 200 \text{ MM Tons}$$

The Federal tract is combined with two contiguous tracts to make an MU. The Federal tract stripping ratio is 1-1/2:1. The stripping ratio of the remaining tracts is 1:1.

Data Summary

Tract	Tons (in millions)		Calculated NPV
	In Tract	In MU	
MU (using the characteristics of Tract 1 and Tract 2 only)	200	200	6 cents per ton
MU (using the characteristics of all tracts)	200	200	5 cents per ton
MU (using the characteristics of the Federal tract only)	200	200	4 cents per ton

1. Estimate the value of the MU using the characteristics of Tract 1 and Tract 2 only. The calculated value is (see Data Summary above):

$$\overline{NPV}_{rt} = 6 \text{ cents per ton.}$$

2. Estimate the value of the MU using the characteristics of all tracts. The calculated value is:

$$\overline{NPV}_{mu} = 5.00 \text{ cents per ton.}$$

3. Estimate the value of the MU using the characteristics of the Federal tract only. The calculated value is:

$$\overline{NPV}_{ft} = 4 \text{ cents per ton}$$

4. Calculate λ as follows:

$$\lambda = \frac{T_{mu} \times \overline{NPV}_{mu}}{T_{ft} \times \overline{NPV}_{ft} + T_{rt} \times \overline{NPV}_{rt}}$$

$$\lambda = \frac{200 \times 5.0}{75 \times 4 + 125 \times 6}$$

$$\lambda = .952$$

5. Calculate estimated value of Federal tract as follows:

$$NPV_{fed} = \lambda [T_{ft} \times \overline{NPV}_{ft}]$$

$$NPV_{fed} = .952 [75 \times 4]$$

$$NPV_{fed} = \$3,150,000$$

$$\overline{NPV}_{fed} = 4.2 \text{ cents per ton}$$

Note: λ is applied only if a rationale exists. In this case the rationale is heterogeneous stripping ratios which increase costs on both tracts.

1. Sale of a Type 3 tract. The tract is an increment to an existing mine. The price should result from a transaction between a knowledgeable buyer and seller, neither of which were obligated to buy or sell. Also, it is preferable that the seller actively be in a reasonably good bargaining position to approximate the relative position of the Federal government in these sales.
2. Sale of other type tracts.
 - a. Sale of a tract that is an entire MU for a new mine operation (Type 1 tract).
 - b. Sale of a portion of an MU for a new mine operation (Type 2 tract).

The use of a Type 1 or a Type 2 tract to estimate value of a Type 3 tract may be less reliable than the use of an appropriate prior sale of a Type 3 tract. The use of a Type 3 tract is preferred since valuation is based on its incremental value to the existing mine operation rather than its average value. Adjustment to an incremental basis can be made if desirable.

3.4.3.1 Unadjusted Comparable Sales

Use the unadjusted value of a comparable sale to estimate the value of a Type 3 tract when it can be shown that the attributes of the comparable tract are sufficiently similar to the attributes of the Federal tract that an adjustment to the comparable sale price to account for differences may not provide a better estimate of value. If an unadjusted comparable is used, set the FMV of the Federal tract equal to the selling price (per ton) of the comparable tract:

FMV = selling price per ton of comparable tract.

3.4.3.2 Adjusted Comparable Sales

Use the DCF-adjusted value of a comparable sale to estimate the value of a Type 3 tract when it is necessary to account for differences in tract attributes. If a DCF-adjusted comparable is used, set the FMV of the Federal tract equal to the adjusted selling price (per ton) of the comparable tract. The adjusted selling price represents the incremental value of the Federal tract to the existing mine operation. It is estimated as follows:

1. Estimate the NPV of the comparable tract.

- a. The comparable tract is an increment to an existing mine (Type 3 tract).

The **incremental** NPV of the comparable tract is estimated using a DCF analysis. First, estimate the NPV (NPV_{old}) of the existing mine operation adjacent to the comparable tract. The NPV is determined from the annual cash flow that would have occurred **without** the addition of the comparable tract. Next estimate the NPV (NPV_{new}) of the **combined** existing mine and comparable tract. Then calculate the incremental value (per ton) of the comparable tract as follows:

$$\overline{NPV}_{comp} = (\overline{NPV}_{new} - \overline{NPV}_{old}) / \text{comparable tract tons.}$$

- b. The comparable tract is a Type 1 or a Type 2 tract.

The **average** NPV of the comparable tract is estimated using a DCF analysis. Estimate the NPV of the MU that includes the comparable tract. (Note: the MU and the comparable tract may be identical or the MU may contain the comparable tract. See Section 3.4.2.) Calculate the value (per ton) of the comparable as follows:

$$\overline{NPV}_{comp} = NPV_{mu} / \text{MU tons.}$$

2. Estimate the incremental NPV of the Federal tract. The incremental NPV of the Federal tract is estimated using a DCF analysis. First, estimate the NPV (NPV_{old}) of the existing mine operation adjacent to the Federal tract. Next estimate the NPV (NPV_{new}) of the combined existing mine operation and Federal tract. Then calculate the incremental value (per ton) of the Federal tract as follows:

$$\overline{NPV}_{fed} = (NPV_{new} - NPV_{old}) / \text{Federal tract tons.}$$

3. Determine the adjustment to the comparable sale price. The adjustment may be either arithmetic or proportional. The adjustment to the comparable sale price is calculated as follows:

- a. Arithmetic adjustment factor:

$$D = \overline{NPV}_{fed} - \overline{NPV}_{comp.}$$

- b. Proportional adjustment factor:

$$R = \overline{NPV}_{fed} / \overline{NPV}_{comp.}$$

4. Estimate FMV. Set the FMV of the Federal tract equal to the adjusted comparable tract selling price.

- a. Arithmetic adjustment:

$$FMV = \text{comparable tract selling price (per ton)} + D.$$

- b. Proportional adjustment:

$$FMV = \text{comparable tract selling price (per ton)} \times R.$$

3.4.3.3 Income Approach

Use the income approach to value a Type 3 tract when comparable sales are unavailable. The incremental value of the Federal tract is estimated as follows:

1. Develop mine plans.

- a. Current mine operation. Develop a mine plan for the current mine operation using historical and projected production rate and development schedule.
- b. Combined mine operation. Develop a mine plan for the combined mine operation (existing mine operation plus Federal tract) using historical and projected production rate and development schedule.

2. Develop cost data. Estimate capital cost, annual operating cost, and revenues for each mine plan using current prices for original and replacement equipment, labor rates, and additional capital investment. Use the coal contract price, as applicable, to estimate revenues.

3. Develop annual cash flow. Annual cash flow is determined from revenue, capital and operating costs, and taxes. The annual cash flow for each mine plan is developed for the period that includes the existing mine start-up, in prior years, to the end of mine life in future years.

4. Estimate FMV of the Federal tract. Estimate the NPV of the current mine operation (NPV_{current}) and the NPV of the combined mine operation (NPV_{combined}) using a DCF analysis. Calculate the incremental value (per ton) of the Federal tract as follows:

$$\overline{NPV}_{\text{fed}} = (NPV_{\text{combined}} - NPV_{\text{current}}) / \text{Federal tract tons}$$

Set the FMV of the Federal tract equal to the incremental value.

$$FMV = \overline{NPV}_{\text{fed}}$$

In some estimations, the Federal tract may be combined with more than one existing mine operation. Select from the most likely alternative configurations the combined operation that results in the largest incremental value. Then set \overline{NPV}_{fed} equal to that value and estimate FMV as described above.

An example of the valuation of a Type 3 tract is illustrated in Exhibit 3.11.

3.4.3.4 Notes on Valuing a Type 3 Tract

Type 3 tract value is estimated from the incremental value added to an existing mine by the addition of the Federal property. Incremental value is determined by estimating the existing mine value in its current state (without the Federal property) and in its potential state (with the Federal property). The incremental difference in property value represents a "value added" that is attributable to the Federal property. As discussed above, the estimation of incremental value may be determined from either comparable sales data or cost/revenue data as follows:

1. The incremental value is based on the value of a direct comparable tract that is incremental to an existing mine.
2. The incremental value is based on the value of a comparable tract that is not incremental to an existing mine but can be used to approximate a incremental comparable tract.
3. The incremental value is based on the NPVs obtained by modeling the existing mine with and without the Federal property.

In performing a DCF analysis to value a Type 3 tract, the following factors should be considered:

1. The existing mine contract coal prices should be used in the valuation process when they are appropriate to the situation modeled.

EXHIBIT 3.11

Tract Type 3: The offered Federal tract constitutes an increment to an existing mine operation.

Offered Federal Tract

Federal Tract 20 MM Tons	Existing Mine 1	120 MM Tons Total
Existing Mine 2		
100 MM Tons Total		

The offered Federal tract is an increment to an existing mine operation. In this example, the offered tract containing 20 million tons may be combined with an adjoining existing mine operation containing 100 million tons or an adjoining existing mine operation containing 80 million tons.

Comparable Tracts

o Comparable Tract 1

15 MM Tons	120 MM Tons Existing Mine Operation	135 MM Tons Total
---------------	---	-------------------------

Selling Price = 3c per ton

The comparable tract is a prior sale of a 15 million ton increment to an existing mine operation.

o Comparable Tract 2

MU
200 MM Tons

Selling Price = 2c per ton

The comparable sale is a prior sale of an entire mining unit for a new mine operation (Type 1 tract).

Data Summary

Tract	Tons in Tract (in millions)	Selling Price	Calculated Total NPV	Calculated NPV per ton
Offered Federal Tract	20	---	---	---
Federal tract plus Mine 1	120	---	\$31.5 million	26.3 cents per ton
Mine 1	100	---	\$30.0 million	30.0 cents per ton
Federal tract plus Mine 2	100	---	\$31.7 million	31.7 cents per ton
Mine 2	80	---	\$29.6 million	37.0 cents per ton
Comparable Tract 1	15	3 cents per ton	---	---
Comparable Tract plus existing mine	135	---	\$37.8 million	28.0 cents per ton
Existing mine	120	---	\$36.0 million	30.0 cents per ton
Comparable Tract 2	200	2 cents per ton	---	9.0 cents per ton

The three methods for valuing a Type 3 tract are as follows:

I. Unadjusted Comparable

The FMV of the Federal tract is set equal to the unadjusted selling price of the comparable tract.

1. Using comparable sale 1: FMV = 3 cents per ton.
2. Using comparable sale 2: FMV = 2 cents per ton.
3. Reconciliation of multiple values:

The multiple estimates of value must be reconciled into a single estimate of FMV either by selecting the clearly superior value or by combining the values using a weighted averaging scheme.

II. Adjusted Comparable

The FMV of the Federal tract is set equal to the adjusted selling price of the comparable tract.

1. Using comparable sale 1 (comparable tract is an increment to existing mine operation):

- a. Calculate the incremental value of the comparable tract, as follows:

1. Calculate the NPV of the existing mine operation adjacent to the comparable tract (see Data Summary above).

$$NPV_{old} = \$36.0 \text{ million}$$

2. Calculate the NPV of the combined comparable tract and existing mine operation.

$$NPV_{new} = \$37.8 \text{ million}$$

3. Calculate the incremental value of the comparable tract.

$$NPV_{comp} = NPV_{new} - NPV_{old}$$

$$NPV_{comp} = 37.8 - 36.0$$

$$NPV_{comp} = \$1.8 \text{ million}$$

EXHIBIT 3.11 (Continued)

4. Convert the incremental value to a per ton basis.

$$\overline{NPV}_{comp} = NPV_{comp} \div \text{comparable tract tons}$$

$$\overline{NPV}_{comp} = \$1.8 \text{ million} \div 15 \text{ million tons}$$

$$\overline{NPV}_{comp} = 12 \text{ cents per ton}$$

- b. Calculate the incremental value of the Federal tract, as follows (Note: In this example, the Federal tract may be combined with existing mine operations in either of two configurations. To determine the incremental value it is necessary to compute the value of the Federal tract in each configuration. The incremental value is selected from the configuration that yields the higher value):

1. Calculate the incremental value of the Federal tract joined with mine 1, as follows:

- a. Calculate the NPV of mine 1.

$$NPV_{old} = \$30.0 \text{ million}$$

- b. Calculate the NPV of the Federal tract combined with mine 1.

$$NPV_{new} = \$31.5 \text{ million}$$

- c. Calculate the incremental value of the Federal tract to mine 1.

$$NPV_{fed} = NPV_{new} - NPV_{old}$$

$$NPV_{fed} = 31.5 - 30.0$$

$$NPV_{fed} = \$1.5 \text{ million}$$

2. Repeat the calculation for the Federal tract joined with mine 2.

- a. Calculate the NPV of mine 2.

$$NPV_{old} = \$29.6 \text{ million}$$

- b. Calculate the NPV of the Federal tract combined with mine 2.

$$NPV_{new} = \$31.7 \text{ million}$$

- c. Calculate the incremental value of the Federal tract to mine 2.

$$NPV_{fed} = NPV_{new} - NPV_{old}$$

$$NPV_{fed} = 31.7 - 29.6$$

$$NPV_{fed} = \$2.1 \text{ million}$$

3. Select the higher incremental NPV and convert to a per ton basis.

$$\overline{NPV}_{fed} = (NPV_{fed})_{max} \div \text{Federal tract ton}$$

$$\overline{NPV}_{fed} = \$2.1 \text{ million} \div 20 \text{ million tons}$$

$$\overline{NPV}_{fed} = 10.5 \text{ cents per ton}$$

- c. Determine the adjustment to the comparable sale price.

1. Arithmetic adjustment factor (preferred)

$$D = \overline{NPV}_{fed} - \overline{NPV}_{comp}$$

$$D = 10.5 - 12.0$$

$$D = -1.5 \text{ cents per ton}$$

or

2. Proportional adjustment factor

$$R = \overline{NPV}_{fed} \div \overline{NPV}_{comp}$$

$$R = 10.5 \div 12.0$$

$$R = 0.875$$

- d. Estimate FMV.

1. Arithmetic adjustment (preferred)

$$FMV = \text{selling price (per ton) of comparable tract} + D$$

$$FMV = 3 + (-1.5)$$

$$FMV = 1.5 \text{ cents per ton}$$

or

2. Proportional adjustment

$$FMV = \text{selling price (per ton) of comparable tract} \times R$$

$$FMV = 3 \times 0.875$$

$$FMV = 2.625 \text{ cents per ton}$$

2. Using comparable sale 2 (Type 1 tract):

- a. Calculate the average value of the Type 1 comparable tract using a DCF analysis. (Note that an incremental value is not calculated for a Type 1 tract)

$$\text{The calculated average value is: } \overline{NPV}_{comp} = 9 \text{ cents per ton.}$$

- b. Calculate the incremental value of the Federal tract, as described above. The calculated incremental value is: $\overline{NPV}_{fed} = 10.5 \text{ cents per ton.}$

EXHIBIT 3.11 (Continued)

c. Determine the adjustment to the comparable sale price.

1. Arithmetic adjustment factor (preferred)

$$\begin{aligned}D &= \overline{NPV}_{fed} - \overline{NPV}_{comp} \\D &= 10.5 - 9 \\D &= 1.5 \text{ cents per ton}\end{aligned}$$

or

2. Proportional adjustment factor

$$\begin{aligned}R &= \overline{NPV}_{fed} \div \overline{NPV}_{comp} \\R &= 10.5 \div 9.0 \\R &= 1.167\end{aligned}$$

d. Estimate FMV.

1. Arithmetic adjustment (preferred)

$$\begin{aligned}\text{FMV} &= \text{selling price (per ton) of comparable tract} + D \\ \text{FMV} &= 2 + 1.5 \\ \text{FMV} &= 3.5 \text{ cents per ton}\end{aligned}$$

or

2. Proportional adjustment

$$\begin{aligned}\text{FMV} &= \text{selling price (per ton) of comparable tract} \times R \\ \text{FMV} &= 2 \times 1.167 \\ \text{FMV} &= 2.33 \text{ cents per ton}\end{aligned}$$

3. Reconciliation of multiple values:

The multiple estimates of value must be reconciled into a single estimate of FMV.

III. Income Approach

The income approach is used to estimate value when comparable sales data are unavailable. The procedure is identical to the method described above to calculate the incremental value (per ton) of the Federal tract. Recall that, in this example, two incremental values are calculated, each corresponding to the Federal tract combined with different existing mine operations. The incremental value for each configuration is calculated, and the FMV of the Federal tract is set equal to the larger incremental value.

$$\text{FMV} = \overline{NPV}_{fed} = 10.5 \text{ cents per ton}$$

2. The mine costs used in the analysis are to be based on the current cost of new equipment, labor, and other capital cost elements. The mine plan should be based on neighboring mine data, if available. Estimates of equipment, capital, and labor requirements should be derived from the neighboring mine if available.
3. The remaining life of equipment and other capital investment is to be credited as salvage to the existing mine operation to avoid misallocating appropriate Federal tract long-run investment costs. Salvage value is calculated as the percentage of actual life remaining multiplied by its value at current replacement cost. (The GEN4 model performs this calculation.)

The DCF analysis is based on an existing mine plan, if available. Generally, the start of mine development in the plan will have begun in a year prior to the current year. However, it will be assumed for the DCF analysis that the decision to begin development of the mine will occur in the current year (or in the year for which lease value is to be estimated). Consequently, the actual mining events simulated by the analysis will be displaced forward in time by the difference between the current year and the commencement of the mining activities. If the start of mine activity occurred prior to the current year, an activity that occurred 2 years after the start of mine activity will be simulated to occur 2 years after the initial year in the DCF analysis. The result of this simulation is that the revenues and costs associated with the actual mine activities also are displaced forward. The NPV of the annual cash flows resulting from the simulated revenue and cost streams is not the same as the NPV of the actual revenue and cost streams because of the additional discounting to the simulated annual cash flow caused by the displacement of these activities from their actual occurrence. To determine the true NPV of the actual annual cash flow streams, the NPV of the simulated cost and revenue streams determined by the DCF analysis is adjusted by compounding forward the NPV at the real discount rate (10%) for the number of years that actual events are displaced forward.

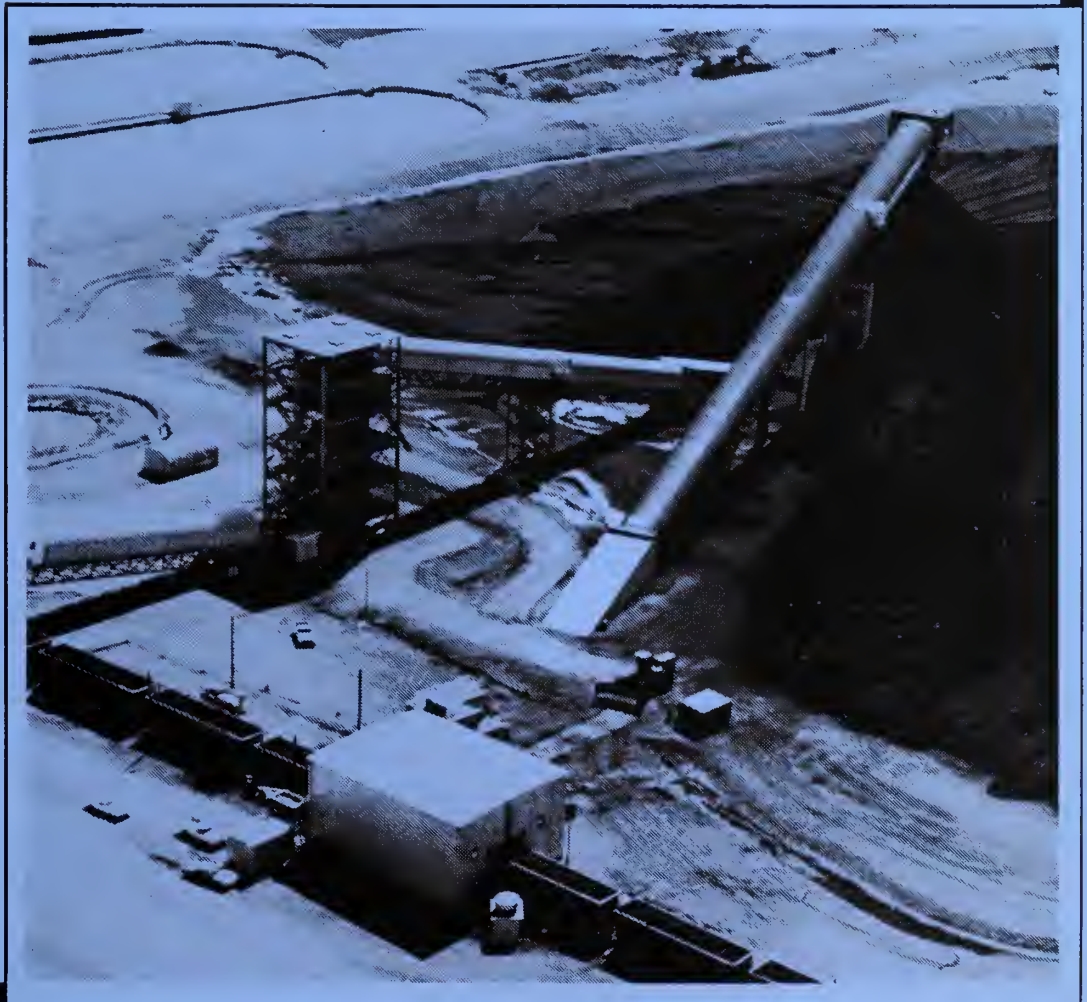
Another concern to be kept in mind is that the incremental method is quite sensitive to total existing mine reserves and production rate estimates. Both estimates should be reviewed by the RET to check for reasonableness and likelihood of occurrence so that the over- or under-estimation of tract value is avoided.

3.4.4 Special Considerations

The procedures discussed above are not meant to constrain the RET to applying specific appraisal methods when their application would be inappropriate. The RET has the flexibility to apply alternative methods to obtain an estimate of value if sufficient information is unavailable to credibly apply the procedures or the situation requiring valuation does not readily adapt to the methods described. In these special cases, the RET may use whatever information is available to develop an estimate of value. The estimate of value must be derived in a reasoned manner. For example, a situation may arise where it is necessary to value a small coal tract for a short-term emergency lease and it is known that mining the tract would be unprofitable. In this case, it might be inappropriate to model the tract or to use DCF-based analyses to estimate value. An alternative approach would be to develop an estimate of value based on the information known about the mine operation requiring the emergency lease. This approach is acceptable, provided the value estimate is not arbitrary and it can be shown to be derived in a reasoned manner. Similarly, the value impact of a lease characteristic difference may in some cases where other data are not available, be derived more simply from a typical mine DCF analysis (see page 35).

Chapter 4

Preparation of Presale Appraisal Report



4. PREPARATION OF PRESALE APPRAISAL REPORT

4.1 FORMAT

Appraisal reports prepared for the Bureau of Land Management (BLM) should follow the general reporting standards described in the Uniform Appraisal Standards for Federal Land Acquisitions and The Appraisal of Real Estate (1983). The appraisal report should be prepared in a narrative format and should use clear, concise language to ensure that the report is understandable to readers. Appraisals must be based on accurate data and logical reasoning. Estimates of value cannot be based on unsupported opinions or personal belief. The report should contain sufficient data and supportable analysis to justify the estimate of FMV.

4.2 APPRAISAL REPORT STRUCTURE

Each appraisal report should contain introductory material, factual data, analysis and conclusions, and exhibits and addenda, following the outline presented below.

4.2.1 Summary Page

The first page of the appraisal report summarizes the appraisal information and conclusions. It contains only brief descriptions of the information presented. The information included on the summary page is as follows:

1. **Tract Name and Location.** Identify the tract and list the county and state in which it is located.
2. **Purpose of Appraisal.** Describe briefly the purpose of the appraisal and include the effective date of the estimate. The description should be a one-line statement.
3. **Appraisal Method.** State the method of appraisal.
4. **Legal Description of Tract(s).** Tabulate the legal description of the tract(s) being appraised in terms of:

- o Township
- o Range
- o Meridian
- o Section
- o Subdivision
- o Acreage

5. **Appraisal Summary.** List the estimated FMV for the tract(s). The appraised value(s) should be presented in cents/recoverable ton, dollars/acre, and total value.

6. **Signature.** The chief of the RET will sign and date the summary page.

4.2.2 Table of Contents

A table of contents is recommended for long reports.

4.2.3 Introduction

The introduction provides an introductory overview of the appraisal. It addresses the purpose of the appraisal and discusses the general assumptions, directions, and guidance for the appraisal.

4.2.4 Appraisal Tract Description

4.2.4.1 Legal Description

This section provides a complete legal description of the tract(s) being appraised. If the description is lengthy, include it as an appendix and refer to it in the text. At a minimum, include the items listed below. Document all sources of data such as:

- o Tract identification or name
- o Township
- o Range

- o Meridian
- o Section
- o Subdivision
- o Total acreage and the acreage used to estimate FMV (if it differs)

4.2.4.2 Appraisal Tract Data

Discuss all pertinent information about the appraised tract(s). At a minimum, include the items listed below. Document all sources of data.

- o Location in region
- o Proximity to transportation and coal markets
- o Type of tracts (e.g., new production, captive)
- o Coal reserves (e.g., geological description, seams, resource base, reserves)
- o Coal quality (i.e., Btu/lb, % moisture, % ash, % sulfur, % volatile matter, % fixed carbon)
- o Supporting documentation (e.g., maps)
- o Other important qualities, when applicable (e.g., high sodium)

4.2.5 Analysis

The analysis section discusses the procedure for determining the value of the Federal coal property.

4.2.5.1 Appraisal Method

An overview of the coal property appraisal technique is presented. The overview includes a discussion of appraisal approaches and appraisal criteria. The methods of obtaining data, appraisal approaches, and the reconciliation method are briefly discussed. The type and quality of available data determine the appraisal method used. Both the reasons

for selecting the method and the reasons for rejecting alternative approaches are discussed.

4.2.5.2 Value Estimated by the Comparable Sales Approach

All comparable sales transactions used must be confirmed by persons having knowledge of the price, terms, and conditions of the sale. Discuss each comparable in relation to the tract being appraised.

1. **General Considerations.** Several general considerations should be included in the appraisal process:

- a. All data considered in the valuation process should be discussed (e.g., comparable sale transactions that may not have been included in the valuation). Support must be provided for including or excluding sales from the appraisal process.
- b. All sales investigated (including sales subsequently rejected) having a reasonable degree of comparability are included. Each sale is included for direct, detailed comparison.
- c. Comparable sales should be identified clearly and consistently to permit cross reference with comments made in the appraisal report.
- d. Support must be developed for an adjustment made in the valuation process. The characteristics that lead to an adjustment are to be established.
- e. Comparisons are made on a sale basis, rather than a characteristic basis. Discuss each sale fully and consider all differences before proceeding to the next sale. Complete the discussion of each sale by considering the

characteristics leading to the adjustment and conclude with an overall comparison with the tract being appraised.

2. **Data Acquisition.** Efforts to acquire data and the sources from which raw data were obtained should be discussed. Include a discussion of how the data are selected and verified.
3. **Data Presentation.** Data documentation must be presented in a manner that would allow the reader to duplicate the data acquisition. Documentation of the data used for direct comparison must be included as a narrative comparison and a comparison summary chart. Identify the data type and essential facts relating to the comparative property that document qualitative and quantitative differences between it and the offered tract. All records and supporting data and documentation must be maintained in auditable files at the BLM field offices. The files will contain all documentation pertaining to the appraisal and supporting its conclusions. The files may also include maps, transaction documentation, telephone conversations, memos, and any other pertinent information.
4. **Data Analysis.** Fair market value is estimated by the comparable sales approach using unadjusted comparable transactions, adjusted comparable transactions, or regression analysis (regression analysis may not be feasible because of insufficient data). Discuss the considerations that resulted in the selection of a specific valuation procedure. If an unadjusted comparable transaction is used, develop support for basing value on an unadjusted selling price. If an adjusted comparable transaction is used, present the data that supports the need for an adjustment.

- a. **Comparison Factors.** Various mineral property characteristics are recognized by the market as influencing value. These factors should be identified, discussed, and analyzed to develop support for a comparable sale price adjustment. Characteristics to be considered include:

- o Date of sale
- o Sale price
- o Lease market conditions
- o Produced coal market prospects
- o Total lease acres
- o Total coal acres
- o Average coal thickness
- o Average overburden thickness
- o Average stripping ratio
- o Recoverable coal resource estimate
- o Coal quality
- o Transportation and marketing
- o Lease terms
 - royalty rates
 - payment terms
 - items sold
- o Other factors

- b. **Adjustment.** An adjusted transaction accounts for differences in the characteristics between the comparable property and the offered tract. Discuss the differences in tract characteristics that require adjustment. Show how these differences are incorporated into the estimation process through the DCF method. Include a discussion of the arithmetic or proportional adjustment procedure.

5. **Reconciliation of Comparable Values.** Multiple estimates of value are reconciled into a single indication of value. Discuss the reconciliation method and the rationale for estimating weights (if used).

4.2.5.3 Value Estimated by Income Approach

Adequate factual data to support the appraisal analysis should be included. The present value of net income method used must be explained in narrative form and supported by a statement of sources and factors.

1. **Data Acquisition, Selection, and Documentation.** The efforts to acquire data and the sources from which the data were obtained should be described. Include a discussion of how the data are collected and verified. Discuss the rationale for selecting specific data elements. The data acquisition should be documented in such a manner that data acquisition may be duplicated. All records and supporting documentation should be maintained in auditable files at the BLM field offices. The files should contain all documentation pertaining to the appraisal and supporting its conclusions. The files may include maps, names, telephone conversations, and any other pertinent information.
2. **Mine Plan.** The development of the mine plan should be described and supported. Refer to the tract and mine characteristics and regional mining methods to support the mine type, production rate, equipment selection, manpower requirements, and other pertinent factors.
3. **Marketing.** The market situation for coal from this lease should be described and supported. Development timing, likelihood of market, coal quality, coal prices, and other relevant information should be explained.

4. **Estimated Production Costs and Revenues.** The method for developing mine production costs must be described and supported. Include an explanation of the model(s) used (if any) and its input requirements. Production revenues also should be estimated from coal prices and production rates.
5. **Capitalization Technique.** The DCF method used should be discussed. Indicate the input requirements and discuss how they were developed for the analysis. If a probabilistic method is used, discuss how probability weights, scenarios, timing, or Monte Carlo inputs (distributions and variances) were developed.
6. **Summary and Indication.** A summary of the basic steps and the final market value indication from the income approach should be included following the income approach narrative.

4.2.6 Exhibits or Addenda

All exhibits needed in the mineral property valuation process, in addition to those used in the body of the report, should be included. Detailed data and information pertaining to the property or other important valuation factors that are too lengthy for the body of the report or that distract from a coherent presentation should be placed in this section.

4.3 SIGNATURE

The chief of the RET will sign and date the appraisal report. The report will be submitted to the designated Deputy State Director for his review and signature.

4.4 CONFIDENTIALITY OF DATA

The sensitive presale estimate of FMV plus any proprietary data used in the estimation of FMV must be properly safeguarded. Only those persons with a "need to know" shall have access to the sensitive or proprietary data.

1. The data shall not be discussed outside of the official BLM meetings and shall not be discussed over the phone.
2. Meetings where the data are discussed shall be held in a secure office and in such a manner that non-BLM personnel and BLM personnel without a need to know are prohibited from having access to confidential data.
3. All confidential data shall be locked in a secure government approved filing cabinet or vault when the data are not actually required for analysis and discussion purposes.
4. All draft and final typed reports relating to FMV presale estimates shall be treated as confidential information.

Chapter 5

Post-Appraisal Process



5. POST-APPRAISAL PROCESS

5.1 INTRODUCTION

The post-appraisal process includes appraisal-related activities that occur after the RET issues a completed appraisal report. These activities include an independent review of the presale appraisal, a post-sale analysis of bids, and a review of the post-sale analysis. Post-appraisal activities are summarized as follows:

1. **Review of Presale Appraisal Report.** The presale appraisal report is independently reviewed for technical content and conformance to appraisal guidelines.
2. **Post-Sale Analysis of Bids.** Evaluation criteria are applied to bids received for offered tracts. Additional market information may be derived from an analysis of bids. This information may be used in the evaluation of bids for which there was no competition.
3. **Review of Post-Sale Analysis.** Recommendation for bid acceptance or rejection is formalized in a post-sale appraisal report. The report is reviewed for technical content and conformance to accepted procedures.

5.2 REVIEW OF PRESALE APPRAISAL REPORT

The presale appraisal report is submitted to the designated Deputy State Director for an initial review for conformance to appraisal guidelines. The report then is submitted for an independent review by a qualified independent reviewer appointed annually by the Lead State Director. The purpose of the independent review is to ensure that the appraisal is consistent with the appraisal guidelines and the estimation of value is soundly based and adequately supported. The approved report is signed by the designated Deputy State Director after completion of the independent review and after incorporation of any necessary revisions. In addition, presale appraisals will be reviewed periodically by the

Washington Office coordination unit (501) to further ensure conformity to this guide.

5.2.1 Review of Appraisal Procedures

The appraisal is reviewed to ensure that it conforms to accepted appraisal procedures as delineated in the appraisal guidelines. The presale appraisal report should document the alternative approaches considered for the appraisal and the reasons for selecting a specific appraisal method. The reviewer will analyze the arguments presented and make an assessment of their validity. The assessment should consider the following arguments:

1. Are input data shown to be selected on a fair and defensible basis?
2. Are input data reasonable and accurate?
3. Is the appraisal procedure appropriate for the available data?
4. Will alternative methods yield a better estimate of value?
5. Does the appraised value seem to be a sound estimate of actual market value?

In summarizing an opinion of the appraisal method, the reviewer will address:

1. Why the appraisal method is or is not appropriate.
2. Any precedent for using or not using the appraisal method.

5.2.2 Review of Supporting Documentation

The appraisal documentation will be reviewed to ensure that all conclusions are adequately supported. The reviewer will ensure that:

1. Each substantive conclusion is supported by data or analysis.
2. References to supporting data are adequately documented.
3. Material included in the appendixes are relevant to the appraisal report and are sufficient to support its conclusions.

The reviewer will document the evaluation of supporting documentation. Insufficient documentation to support conclusions will be highlighted, and the report will be returned to the RET for completion. If applicable, the reviewer will suggest sources of additional information to assist the appraisal process.

5.2.3 Documenting the Presale Appraisal Report Review

The reviewer will attach a written memorandum to the presale appraisal report that indicates the scope of the review and supports the recommended actions prior to the sale.

5.3 POST-SALE ANALYSIS OF BIDS

The Department of the Interior is chartered with accepting or rejecting a sealed bid on a Federal coal lease tract. In evaluating the bids, the sale panel will screen all bids to determine if they qualify for further consideration. To qualify for further consideration, the bid must satisfy all of the following criteria:

1. The bid meets or exceeds the minimum bid.
2. The bidder passes all the qualification requirements delineated in 43 CFR 3400.
3. There is no indication of collusion in the bidding of the coal lease tract(s).

Bids passing the screen are reviewed for recommendation to the authorized officer for acceptance or rejection.

5.3.1 Bid Acceptance Process

Prior to opening, the bids are divided into three categories: tracts with two or more bids, tracts with one bid, and tracts with no bids. Tracts with no bids are of no further consideration in this process. The review of the bids proceeds sequentially as described in the following sections.

5.3.1.1 Tracts with Two or More Bids

At least two countable bids must be received for the tract. A bid must meet or exceed 25 percent⁷ of the presale appraisal to be countable. Any bid less than 25 percent of the presale appraisal must be excluded from the count. If two or more bids equal or exceed 25 percent of the presale appraisal, the recommendation for acceptance of the high bid on that tract is decided by the averaging rule. If only one countable bid is received for the tract, the bids are set aside for evaluation with one-bid tracts. If no countable bids are received, the bids also are set aside for evaluation with one-bid tracts.

The recommendation for acceptance of the high bid on a tract with two or more countable bids is decided by the averaging rule. The averaging rule adds the presale appraisal to the sum of the countable bids and divides by the number of countable bids plus one. This average is called the **Average Evaluation of Tract (AEOT)**. A high bid equal to or greater than the AEOT is recommended for acceptance. A high bid less than the AEOT is recommended for rejection.

⁷The 25 percent value is being used pending current study results.

Tracts whose high bids are recommended for acceptance by the AEOT rule will be examined to isolate those tracts that can be used as post-sale comparables. Tracts used as post-sale comparables must satisfy the **eligible** and **selectable** criteria for comparable tracts. If these criteria are satisfied, the tract is a candidate for use as a post-sale comparable in evaluating remaining tracts.

5.3.1.2 Tracts with Only One Bid

Tracts receiving only one bid and tracts with two or more bids that have fewer than two countable bids are reviewed after the evaluation of the tracts with two or more countable bids has been completed. Tracts from the preceding evaluation accepted as candidate comparables for use in the post-sale analysis should be re-evaluated to see if they represent appropriate comparables for the tracts involved.

Tracts accepted as comparables will provide current competitive market data about lease values. Bids for tracts receiving only one bid or tracts with two or more bids that had fewer than two countable bids are recommended for acceptance or rejection as follows: tracts for which only presale comparables and presale appraisals apply are recommended for acceptance if the high bid exceeds the presale appraisal; tracts for which a reappraisal has been made on the basis of an additional comparable from the sale are recommended for acceptance if the high bid exceeds the reappraised value.

5.3.2 Post-Sale Appraisal Report

The RET will prepare a post-sale appraisal report to document the post-sale appraisal analysis. The report will document all factors to be considered by the sale panel in the recommendation of bid acceptance or rejection. For example, if the presale appraisal is to form the basis for bid acceptance or rejection, the valuation procedure from which the presale appraisal was drawn should be included in the post-sale appraisal report. If a post-sale comparable was used to reappraise a tract, the criteria for selecting the comparable should be discussed and the new valuation explained as in the presale report. The report will be reviewed by the designated Deputy State Director and the independent reviewer for conformance to the appraisal guidelines.

A publicly available version of the report will be prepared by deleting all sensitive and proprietary material.

5.4 REVIEW OF POST-SALE ANALYSIS

The pre- and post-sale appraisal reports are submitted to the sale panel for evaluation. The sale panel will make a recommendation to accept or reject a qualified high bid on the basis of the post-sale appraisal report values. The sale panel will document its recommendations and submit them to the authorized officer for a decision. The sale panel will review the post-sale appraisal report as follows:

1. Review the procedures used in developing the post-sale appraisal report and the pre- and post-sale analyses that form the basis for bid acceptance or rejection.
 - a. If necessary, submit questions to cognizant individuals to clarify salient features of each analysis.
 - b. Identify discrepancies in the analysis that require resolution prior to the decision to accept or reject a bid.
 - c. Request clarification of discrepancies identified in the review.
2. Request revision of the post-sale analysis only if one of the following conditions occur:
 - a. A clear technical error that could and should have been detected prior to the sale is identified.
 - b. The appraisal standards set forth in the guidelines were not met and the appraised value appears unreasonably derived, unsound, or inadequately explained.

3. After resolution of all outstanding issues, the sale panel will prepare a memorandum that documents the results and recommendations of the review of the post-sale analysis.

5.5 CONFIDENTIALITY OF DATA

All post-sale appraisals and reports as well as all presale appraisals and reports, along with other proprietary data, must be treated as confidential and held secure during the post-sale bid evaluation process. When bid acceptance/rejection decisions have been reached by the authorized officer, only the estimated value of tracts accepted shall be made available to the public upon request.

Chapter 6

Land Exchange Process



6. LAND EXCHANGE PROCESS

A Federal coal fee property may be disposed of by exchange by the Secretary of the Interior under authorizing legislation contained in Section 206 of the FLPMA. In exercising the exchange, the act requires that the exchange must be in the public interest and the value of the lands accepted by the government must be of at least equal value to those given in exchange. Federal coal lease exchanges are conducted under legislation specific to each exchange. Specific legislation generally requires that the lands be of at least equal market value and that the exchange be in the public interest. BLM regulations now require that estimate of fair market value be made for purposes of equal coal value.⁸ If the lands are not of equal value, financial compensation usually may be provided to offset the differences in value so long as payment does not exceed 25 percent of the total value of the lands transferred out of Federal ownership.

Federal coal lease and fee exchange is accomplished through negotiation between the affected parties. The negotiation process is directed toward achieving realistic estimates of property value through information exchange between the government and the other party. From the government view, negotiation will promote a more equitable exchange because the objective is to provide better current property information to the government's appraisal team. The government still maintains some leverage over the proceedings because the State Directors may let the negotiations lapse if it is felt that there is insufficient cooperation and information to develop a reasonable estimate of value.

⁸ If current regulations are changed, a recoverable ton for recoverable ton exchange may be considered without fair market appraisals if all offered tract major coal lease characteristics (e.g., coal quality, transportation, and minability) are at least as good as the characteristics of the selected tract. In these exchanges (now used for oil shale), a definitive examination of the characteristics would be documented to verify that an evaluation of the major characteristics of the offered and selected tracts unquestionably indicates that the fair market value per ton of the offered tract is at least equal to the fair market value per ton of the selected tract.

Exchanges are conducted under regulations CFR 2200, 3435, and 3436. At the discretion of the State Director, the RET is responsible for appraising property value. The RET should prepare an appraisal using its own information and any additional information provided by the other party. This additional information should be independently verified as to its accuracy and appropriateness to the appraisal. The procedure for determining the market value used by the RET should follow the lease sale appraisal procedures discussed above in this guide for each tract. The exchange process should be as follows.

1. A coal lands exchange proposal is provided to the District or State BLM office.
2. The proposed exchange is examined by the State BLM office to determine if it is in the public's interest to proceed with the exchange.
3. If it appears that acquisition of the non-Federal land could be in the public interest, the exchange can proceed or the BLM can make a counter proposal (for example, offer a different property in exchange).
4. If the BLM and the applicant agree on lands that might be exchanged, the BLM must perform the following activities before it can proceed with the exchange process:
 - a. Examine alternatives to the proposed exchange.
 - b. Develop an environmental assessment (EA) and, if necessary, an environmental impact statement (EIS) for the proposed exchange.
 - c. Through the EA/EIS, land report, and public meeting, determine if the exchange is in the public interest, after due consideration of Department of Justice advice concerning antitrust consequences.

- d. Informally consult with the State government and other interests for their views concerning the proposed exchange.
5. If the BLM decides to proceed with the exchange, the RET and the applicant's technical staff independently collect the information required to appraise the exchange properties and to prepare preliminary evaluations. For fee exchanges, the applicant normally is responsible for providing geologic information. For lease exchanges, exploration costs are allocated on a case-by-case basis.
6. The RET and a State BLM office management representative meets with the applicant's technical staff and its management representative to review the available data and to discuss appropriate appraisal methods. The RET prepares a draft appraisal using the best and most realistic data available. The draft appraisal conforms to the guidelines set forth in this guide. An applicant's preliminary appraisal may form the basis for the draft appraisal provided it is checked for accuracy, lack of bias, completeness, and conformance to the appraisal guidelines. If the applicant's appraisal is used, the RET should fully examine these factors.
7. The RET and the State BLM office representative discuss with the applicant the results of the draft appraisal. The applicant may provide comments and information on the draft appraisal methods and data.
8. The RET performs a final appraisal on the exchange tracts as now delineated if directed by the State Director. The final appraisal will include improvements to the data or methods that are developed by the RET or result from the discussion of preliminary results with the applicant.

Adjustment to the delineation of exchange properties may be made to achieve equal value.

9. The State Director and his staff examine the final appraisal and the proposed exchange to ensure that the exchange is in the public's interest and that the government receives at least equal value in exchange.
10. The State Director and the applicant discuss the exchange to determine whether the proposed exchange will be satisfactory to both parties. If agreement cannot be reached, the specific exchange may be abandoned.
11. The final decision concerning the exchange is made by the State Director after public hearings and comment.



APPENDIX A. GLOSSARY OF TERMS

Average Evaluation of Tract (AEOT):

A tract value based on an averaging of the government's presale estimate with two or more countable bids. A high bid equal to or greater than the AEOT is recommended for acceptance; otherwise, the high bid is recommended for rejection.

Bonus Bid:

The dollar amount offered by a potential lessee as consideration for receiving a lease. Under existing regulations, the bonus bid must meet or exceed fair market value to be accepted by the Department of the Interior.

Bureau of Land Management (BLM):

The nation's largest land manager. It administers lands in Federal ownership under multiple-use principles in the public interest. The BLM is responsible for issuing coal leases and conducting land use planning in the Federal coal management program.

Bypass Tract:

A tract that contains federal recoverable coal, which if not leased, would be bypassed in the reasonably foreseeable future.

Captive Tract:

A Federal coal property of potentially much greater value to a single bidder because the bidder owns the adjacent mine or mineral lease rights (see Bypass Tract and Maintenance Tract).

Coal Tract:

A defined area that forms a mining unit or a portion of a mining unit (see Tract Type 1, Tract Type 2, and Tract Type 3).

Countable Bid:

A bid satisfying initial screening criteria that meets or exceeds 25 per cent of the government's presale estimate.

Designated Deputy State Director:

The Deputy State Director who reports to the State Director in charge of the RET located in either Santa Fe, New Mexico; Denver, Colorado; or Cheyenne, Wyoming.

Development Right:

A right to extract a mineral from a deposit.

Diligence:

Compliance with the term of a Federal coal lease requiring production in commercial amounts of recoverable coal reserves (one percent of the mining unit reserves) within a 10-year period beginning on the date of lease issuance.

Emergency Leasing:

The leasing of Federal coal needed by an existing mine for one of the following reasons: (1) coal is needed within 3 years of the date of the lease application to maintain a mine at its current average annual level of production or to supply coal for contracts signed before July 19, 1979, or (2) without the emergency lease, Federal coal would be bypassed by mining. An emergency lease can be issued for no more than 8 years of recoverable coal reserves, and to be issued an emergency lease, a mine's need for the coal deposit must result from reasonably unforeseen circumstances.

Energy Minerals Activity Recommendation System (EMARS):

The 1975 coal management program made up of three phases: (1) nomination and programming, (2) scheduling, and (3) leasing.

Exchange:

A trading of public lands (surface, subsurface, or both) for lands in other ownerships (see **Fee Coal Exchange**, **Fee Mineral Exchange**, and **Fee Title Exchange**).

Fair Market Value (FMV):

That amount of cash or the equivalent for which the coal deposit would be sold or leased by a knowledgeable owner willing, but not obligated, to sell or lease to a knowledgeable purchaser who desires, but is not obligated, to buy or lease.

Federal Coal Leasing Amendments Act of 1976 (FCLAA):

A law specifying rules to guide the Federal Coal Leasing Program.

Federal Lands:

Lands owned by the United States, without reference to how the lands were acquired or which agency administers the lands, including mineral estate or coal estate underlying private surface, excluding lands held by the United States in trust for Indians, Aleuts, or Eskimos, and lands within the boundaries of Federal Indian Reservations.

Federal Lands Policy and Management Act (FLPMA):

Law specifying how public lands are to be managed.

Fee Coal Exchange:

A fee mineral exchange involving coal.

Fee Mineral Exchange:

An exchange that involves subsurface (mineral) rights only.

Fee Title Exchange:

An exchange that involves the entire property, both surface and subsurface.

In Situ Coal:

Coal in its natural or original position.

Lease:

Federal coal lease or license to mine issued under the coal leasing provisions of the mineral leasing laws that authorizes the exploration for, or extraction of, coal only under an approved exploration or mining plan.

Maintenance Tract:

A tract that lacks the recoverable reserves to support a new mining operation, on which recoverable reserves are large enough only to extend the life of an adjacent, existing mine or to permit expanding that mine's annual production.

Mineral Leasing Act of 1920 (MLA):

The Federal law that establishes the procedures for the disposal of certain federally owned mineral deposits (including coal) on public domain lands of the United States.

Mineral Leasing Act For Acquired Lands:

The Federal law that provides for the disposal of certain federally owned mineral deposits (including coal) on acquired lands of the United States under the procedures of the MLA.

Mineral Right:

A right to ownership of a mineral reserve.

Minimum Bonus Bid:

The least amount that must be bid at a Federal coal lease sale, as stated in the notice of sale, to qualify a bid for consideration; the minimum bonus bid is not necessarily fair market value.

Mining Unit (MU):

An area of coal land that can be developed and mined in an efficient, economic, and orderly manner with due regard for the conservation of coal reserves and other resources.

Net Present Value (NPV):

The value derived by reducing cost and revenue streams to a single number in which future costs and revenues are discounted to the present.

New Mine Tract:

A coal tract that contains enough Federal recoverable coal of sufficiently high quality, either by itself or in combination with surrounding nonfederal recoverable coal, to justify spending money and the effort to develop and implement new mining operations.

Public Land:

Federal land administered by the BLM.

Recoverable Coal Reserves:

The minable coal reserve base excluding all coal that will be left unmined, such as pillars, fenders, and property barriers.

Regional Coal Team:

A body, consisting of BLM state directors and state governors or their representatives, that guides coal activity planning within a Federal coal production region and that makes leasing level and lease sale recommendations to the Secretary of the Interior.

Regional Evaluation Team (RET):

A group of BLM professionals that performs economic appraisals on a regional basis under the direction of the BLM Deputy State Director where the team is located.

Royalty:

The amount established in a lease that the lessee must pay the lessor as part of the consideration for the right to remove coal for sale or use. Under the FCLAA, royalty is expressed as a percent of the value of the coal. In older leases, royalty was expressed as a fixed amount per ton.

Sale Panel:

A group appointed by the BLM state director to review lease sale results and the fair market value analysis and prepare a report recommending acceptance or rejection of bids.

Tract Type 1:

A single tract that constitutes a mining unit (MU) for a new mine operation. The tract contains sufficient reserves that can be developed and mined in an efficient, economic, and orderly manner with due regard for the conservation of coal resources and other resources.

Tract Type 2:

A single tract that constitutes a portion of an MU for a new mine operation. The tract does not contain sufficient reserves to independently support a mining operation; however, the reserves can be used with other contiguous reserves to create an MU for a new mine operation.

Tract Type 3:

A single tract that constitutes an increment to an existing mine operation. The tract does not contain sufficient reserves to independently support a mining operation; however, the reserves can be mined economically in conjunction with an existing mine operation.

APPENDIX B. BIBLIOGRAPHY

BOOKS

- American Institute of Real Estate Appraisers. The Appraisal of Real Estate, Eighth Edition. Chicago, Illinois, 1983.
- _____, The Appraisal of Rural Property. Chicago, Illinois, 1983.
- _____, Reader's Guide to the Appraisal Journal, 1970-1980. Chicago, Illinois, 1981.
- _____, Readings in the Appraisal of Special Purpose Properties. Chicago, Illinois, 1981.
- Eaton, J.D. Real Estate Valuation in Litigation. American Institute of Real Estate Appraisal, Chicago, Illinois, 1982.
- Gentry, G.W. and T.J. O'Neal. Mine Investment Analysis. Society of Mining Engineers, New York, New York, 1984.
- Harris, D.P. Mineral Resources Appraisal. Clarendon Press, Oxford, England, 1984.
- Himstreet, W.C. Writing Appraisal Reports. American Institute of Real Estate Appraisal, Chicago, Illinois, 1974.
- Interagency Land Acquisition Conference. Uniform Appraisal Standards for Federal Land Acquisitions. Washington, D.C., 1973.
- Kolbe, A.L., and J.A. Read, Jr. The Cost of Capital Estimating the Rate of Return for Public Utilities. The MIT Press, Cambridge, Massachusetts, 1984.
- Stermole, F.J. Economic Evaluation and Investment Decision Methods. Investment Evaluations Corporation, Golden, Colorado, 1974.

MINING HANDBOOKS

- Caterpillar Tractor Co., Caterpillar Performance Handbook. Caterpillar Tractor Company. Peoria, Illinois
- Machine performance data. Includes tables and curves showing cycle times or hourly production figures for machines under various operating conditions. Presents methods for estimating machine owning and operating expenses.
- Church, Horace K., 1981. Excavation Handbook. McGraw-Hill Book Company, New York, New York.
- Discusses principles, procedures, equipment, and costs for open-cut mining excavation and handling. Provides information on costs of owning and operating equipment and facilities.
- Cummins, Arthur B. and Ivan A. Given, ed., 1973. SME Mining Engineering Handbook, Volumes I and II. Port City Press. Baltimore, Maryland.

Provides planning, mine practices, and mine engineering information. Volume I discusses exploration and underground mining. Volume II provides information on surface mining and mine costing.

SOURCES OF COAL MARKET, PRODUCTION, and PRICE TREND DATA

EIA Databases

Quarterly Coal Consumption Report-Manufacturing Plants

Data concerning coal receipts, stocks, prices, and consumption for manufacturing plants other than coke plants. Data include types, quantities, and costs of coal received by contract and spot purchases.

Coke Plant Report

Data include production, transfers, consumption, sales, and stocks of coal and coke from operating coke plants.

Coal Distribution Report

Provides coal distribution data. Data include origin of coal produced and purchased, distribution by mode of transportation and consumer category, sales to other coal distributors, and end-of-quarter stocks.

Coal Production Report

Provides information on current and prospective coal production, transportation, conversion, and utilization. Data include company identification; types of mining operation; recoverable reserves; production quantity and value by distribution, stocks, and productive capacity; employment; and projected production.

Monthly Powerplant Report

Provides net generation, fuel consumption, and end-of-month fuel stocks for all electric generating plants.

Annual Projection of System Changes

Provides data on planned generating units, peak load forecasts, and energy forecasts.

Coordinated Regional Bulk Power Supply Program Report

Provides information concerning the regional planning of electric utilities for a 15-year advance period.

Monthly Report of Cost and Quality of Fuels for Electric Plants

Provides data on plant type, type and source of fuel, quantity of fuel received, quality of fuel, and fuel cost.

Other Sources

Coal Network Associates, Inc. Coal Supply Contracts and Power Plant Consumption. Fort Collins, Colorado.

Provides information on coal supply contracts and utility consumption. Data include receiving utility plant and location; existing and projected generation plant capacity; projected coal requirements; power plant consumption; contract and total deliveries by power plants; delivered coal quality by power plant; delivered contract prices; supplier company, mine, and location; contract coal quality; annual contracted quantity; and contract start and end date.

National Coal Association. Steam Electric Market Analysis. Washington, D.C.

Monthly compilation of coal consumption, stockpiles, and percent generation by type fuel for major coal burning power plants.

National Coal Association. Power Plant Coal Deliveries. Washington, D.C.

Monthly report of coal deliveries to all utilities making coal purchases. Data include purchase price, quality, quantity, type of contract, and source.

National Coal Association. International Coal. Washington, D.C.

Provides data on coal supply and demand, imports and exports, average values, and coal freight rates for major coal producing and consuming nations.

National Coal Association. Coal Data. Washington, D.C.

Provides data on coal production, consumption, stocks, distribution, and leased coal reserves.

National Coal Association. Weekly Statistical Summary. Washington, D.C.

Provides information on weekly coal production and consumption, electrical output, steel production, and steam coal prices.

SOURCES OF TRANSPORTATION DATA

Association of American Railroads. Railroad Coal Statistics. Washington, D.C.

Provides information on coal shipments by rail. Also provides some data on railroad coal transportation rates.

Fieldston, Inc. Coal Transportation Report. Washington, D.C.

Publishes biweekly information on rail and barge transportation rates. Rail/Route guide provides data on transportation water and routings to selected markets and the coal purchasing pattern in each market.

Interstate Commerce Commission. Washington, D.C.

Compiles statistics on coal contract rates.

The Journal of Commerce. Port Import/Export Reporting Service. New York, New York.

Provides export information on mineral commodities. The computerized system contains product data, name and location of U.S. consignee/exporter, country of origin or destination, quantities, weights, and other data.

National Coal Association. Coal Traffic. Washington, D.C.

Provides recent information on coal transportation by rail track, inland waterways, and Great Lakes. Includes data on equipment, tonnages, and revenue received by coal-carrying railroads. Also includes coal contract summaries between shippers and railroads, and detailed rail rates for U.S. exports from mine to port of exit.

SOURCES OF CAPITAL AND OPERATING COST DATA

Robert Snow Means Co. Building Construction Cost Data. Kingston, Massachusetts.

Provides average unit prices for building construction items. Includes information on hourly and daily wage rates for construction workers.

Dataquest, Inc. Green Guide. San Jose, California.

Contains original, current, and resale values for all major classes of construction equipment including earthmovers, haulage units, and excavators. Also provides equipment specifications.

Dataquest, Inc. Cost Reference Guide. San Jose, California.

Provides detailed ownership and operating costs for major construction equipment including earthmovers, haulage units, excavators, and drills. Data include hourly ownership and overhaul expenses, including depreciation, overhead, parts and labor; field repair and expenses, including parts, labor, fuel or electricity, lubrication, and tires; and economic life of equipment.

Bureau of Labor Statistics. Producer Price Indexes. Washington, D.C.

Monthly information on average changes in mining equipment prices.

United Mine Workers of America. Wage Contract. Washington, D.C.

Provides information on hourly wage rates by job classification for surface and underground miners and support personnel.

Local Utilities

Provides local monthly power and energy rate schedules. Also provides information on the cost of bringing power distribution to the site.

Equipment Manufacturers

Provides equipment costs and specifications, including delivery and set-up charges.

SOURCES OF GEOLOGIC DATA

State Geologic Survey

Provides stratigraphic sections, geologic descriptions, hydrologic studies, lithologic logs, and surface geology and structure information.

U.S. Geological Survey

Provides geological maps, plats, land description, and hydrologic information.

State Bureau of Mines and Mineral Resources

Provides resource and hydrologic data.



Bureau of Land Management
Library
Bldg. 50, Denver Federal Center
Denver, CO 80225